



CHRISTIAN BRZINSKY-FAY

School-to-Work Transitions in
International Comparison



ACADEMIC DISSERTATION

To be presented, with the permission of
the board of the School of Social Sciences and Humanities
of the University of Tampere,
for public discussion in the Lecture Room Linna K 103,
Kalevantie 5, Tampere
on October 28th, 2011, at 12 o'clock.

UNIVERSITY OF TAMPERE

ACADEMIC DISSERTATION

University of Tampere

School of Social Sciences and Humanities

Finland

Distribution
Bookshop TAJU
P.O. Box 617
33014 University of Tampere
Finland

Tel. +358 40 190 9800
Fax +358 3 3551 7685
taju@uta.fi
www.uta.fi/taju
<http://granum.uta.fi>

Cover design by
Mikko Reinikka

Acta Universitatis Tamperensis 1663
ISBN 978-951-44-8588-6 (print)
ISSN-L 1455-1616
ISSN 1455-1616

Acta Electronica Universitatis Tamperensis 1126
ISBN 978-951-44-8589-3 (pdf)
ISSN 1456-954X
<http://acta.uta.fi>

Contents

1. ACKNOWLEDGEMENTS.....	5
2. MOTIVATION & OBJECTIVES	6
2.1. ABSENCE OF A SCHOOL-TO-WORK TRANSITION THEORY	7
2.2. PERSISTING DIFFERENCES DESPITE GLOBALISATION	9
2.3. ANALYSIS OF REGIMES AS COMPLEMENTARY INSTITUTIONS WITH CONJUNCTURAL EFFECTS.....	10
2.4. LONGITUDINAL ANALYSIS OF TRANSITION PROCESSES.....	12
3. SCHOOL-TO-WORK TRANSITIONS RESEARCH: STATE OF THE ART	16
3.1. SOCIOLOGICAL APPROACHES.....	16
3.2. ECONOMIC APPROACHES	19
3.3. POLICY-FOCUSSED RESEARCH.....	21
4. THEORETICAL CONSIDERATIONS	23
4.1. INSTITUTIONAL THEORIES.....	23
4.2. LABOUR MARKET THEORIES	25
5. METHODOLOGICAL INNOVATIONS	28
5.1. SEQUENCE ANALYSIS	28
5.2. QUALITATIVE COMPARATIVE ANALYSIS	30
6. STRUCTURE OF THE DOCTORAL THESIS.....	34
6.1. SEQUENCE ANALYSIS USING STATA	34
6.2. LOST IN TRANSITION: LABOUR MARKET ENTRY SEQUENCES OF SCHOOL LEAVERS IN EUROPE	35
6.3. GET THE BALANCE RIGHT: RISK AND FLEXIBILITY IN SCHOOL-TO-WORK TRANSITION SEQUENCES.....	38
6.4. INSTITUTIONS AND SCHOOL-TO-WORK TRANSITIONS: CONJUNCTURAL EFFECTS ON LABOUR MARKET INTEGRATION OF SCHOOL LEAVERS	40
6.5. THE CONCEPT OF TRANSITIONAL LABOUR MARKETS: A THEORETICAL AND METHODOLOGICAL INVENTORY	41

7.	COUNTRY PROFILES.....	44
7.1.	AUSTRALIA	45
7.2.	DENMARK.....	46
7.3.	FINLAND	47
7.4.	FRANCE.....	49
7.5.	GERMANY	50
7.6.	NORWAY.....	52
7.7.	UNITED KINGDOM.....	54
7.8.	UNITED STATES.....	56
8.	SUMMARY & OUTLOOK	58
	APPENDIX	61
A1.	YOUTH UNEMPLOYMENT RATE AND RELATIVE YOUTH UNEMPLOYMENT RATE IN THE OECD, 1990-2008	61
A2.	MULTINOMIAL LOGIT MODEL FROM THIRD ARTICLE (SECTION 6.3)	62
A3.	FUZZY-VALUES AS BASIS FOR THE FOURTH ARTICLE (SECTION 6.4)	63
A4.	RELATIVE YOUTH UNEMPLOYMENT RATES IN OECD COUNTRIES, 1990-2008	64
	REFERENCES	65

1. Acknowledgements

This introduction to the article-based dissertation is the author's instrument to demonstrate his qualification for receiving a doctoral degree in social policy from the University of Tampere. It is designed to serve as a frame for five scientific articles regarding the field of school-to-work transitions, of which four have already been published and one is under review (September 2011). The articles address methodological, theoretical as well as thematic issues and, therefore, represent the scientific process as a whole. Although both this introduction and the articles bear the author's name, a couple of supporters deserve to be acknowledged for having provided invaluable backing of different kinds. Without their support, it is doubtful whether this dissertation would have been finished.

First of all, I would like to thank my family – my wife Cordula and my children Bruno and Laura – for giving everything a meaning, tolerating my sulkiness and strange working hours, distracting me at the right time, and motivating me over a long period of time by their mere existence. My parents, even though social science thinking seems odd to them, have always trusted and supported me so I could cut my own path from the beginning of my studies onwards. The financial and scientific assistance of the *LabourNet* constituted the foundation for my scientific work. My supervisors – Pertti Koistinen and Olli Kangas – have offered the perfect combination of tolerance and incentives that motivated me to work continuously on this dissertation. The same is true of Günther Schmid, whose unique talent to integrate seemingly opposite points of view has enabled me to believe in the value of my own scientific efforts from the very beginning. Christoph Hilbert was always willing to provide mental backing in critical situations by letting me benefit from his experience and serenity. I also want to thank Jutta Allmendinger and my colleagues in the project group “Education and Transitions into the Labour Market” at the *Wissenschaftszentrum Berlin für Sozialforschung (WZB)* for the challenging and enjoyable daily interaction. Last but not least, I would like to thank the two evaluators – Juho Härkönen and Gerhard Bosch – who have evaluated this dissertation on behalf of the University of Tampere.

In order to provide guidance on the various papers, this introduction will begin by presenting the unresolved questions within the field of school-to-work transitions that initially motivated me to explore this topic (section 2). After that, existing research from a sociological, economic and political science viewpoint is summarised briefly (section 3). Next, the theoretical considerations (section 4) and methodological innovations (section 5) that form the basis for the articles are described. Section 6 shows the main hypotheses and results of the single papers. The country profiles (section 7) complete this introduction for two reasons: first, they constitute the frame of reference for my analysis of school-to-work transitions in OECD countries, because in order to assess these processes, the whole variation needs to be considered. Second, within the single articles, there was not enough space for describing the countries in such a detailed manner, which is necessary to become acquainted with the objects of research.

2. Motivation & Objectives

The transition from school to work remains a question of enduring relevance, despite the fact that there is no shortage of policy activities and research in this field. Supporting young people in this critical period is an important task not only because of economic reasons, but also because of individual and social welfare. Despite the research and policy activities of the past 30 years, it remains obvious that labour market mechanisms are incapable of solving the youth integration problem without government or corporate intervention, and therefore, this becomes an ongoing societal task. A smooth transition into the labour market preserves labour market supply, prevents loss of human capital, provides life perspectives for young people, and assures their individual independence. Success or failure at this point may have long-term consequences for people's later employment career and for social inequality dynamics (e.g. Mroz and Savage 2006; Steijn, Need et al. 2006; Bell and Blanchflower 2010; Julkunen 2010).¹ However, when comparing the development of youth unemployment across the OECD countries within the last two decades, no improvement can be observed (see appendix A1). Additionally, some researchers have observed processes of polarisation or segmentation in the youth labour market – that is, a number of specific disadvantaged groups such as immigrants (e.g. Kogan 2004) or low-skilled school leavers (e.g. Solga 2002; Fenton and Dermott 2006) face increasing risks of social exclusion. For these reasons, both policy makers and social scientists continue to be interested and engaged in school-to-work transition research.

A look at the huge body of existing research on school-to-work transitions might suggest that there is nothing left to be examined. But apart from the practical fact that the societal problem of integrating youth into the labour market is still evident, there are four fundamental research questions that remain to be addressed. These questions form the motivation for my dissertation. First, a theory of school-to-work transitions does not exist, although the topic remains an important one for social science researchers and policy makers alike. Second, the assumption, made from various theoretical perspectives, that globalisation and increasing international integration lead to the convergence of institutions cannot be confirmed regarding school-to-work transitions, where persisting differences must be attributed to institutional differences to a large extent. Third, the analysis of institutional effects, despite a number of very prominent developments, remains at a relatively basic level conceptually. On the one hand, institutions are seen as complementary and affecting individual behaviour in connection with each other in terms of 'regimes'; on the other hand, available studies analyse institutional dimensions as single variables independent of each other. And fourth, at the micro level, individual transitions are only analysed as single events, not as processes. Apart from these shortcomings, one

¹ Of course, the extent to which youth unemployment affects people's later careers depends on multiple factors such as duration of unemployment or educational level (cf. Hammer 2007).

has to admit that institutional arrangements are in constant flux and that there have been fundamental institutional changes in recent years.

I certainly do not aspire to resolve all these shortcomings completely within this dissertation, because this would require a large-scale research project involving many researchers from different countries. This dissertation only seeks to make some basic but essential steps towards the comprehensive and satisfying comparative analysis of school-to-work transitions.

2.1. Absence of a School-to-Work Transition Theory

"[...] transition-system research often appears theoretically eclectic and fragmented."

(Raffe 2008: 278)

Despite the central importance of labour market entry for people's life course in general, and for their employment careers in particular, a wide-range theory of the transition from school to work is not available. Neither life course research nor institutionalism has been able to formulate adequate and sound theoretical rules that can be tested across nations. Of course, there have been some attempts, for example the work on individual transition types by Sackmann and Wingers (Sackmann and Wingers 2003), who examine school-to-work transitions from a sociological life course perspective; or human capital theory, which aims to analyse the relation between education and labour market outcomes on a generic level. But these approaches have not been able to provide satisfactory explanations of the differences between countries regarding the transition from school to work. The standard explanations given by social scientists to account for country differences generally refer to cultural, political, or institutional factors. In this dissertation, the focus is on institutional explanations, because they reflect to a large extent cultural norms and prior political decision-making processes. However, like cultural and political theories, institutional theories suffer from the fact that they are either too general or too specific in nature. In the former case, theories are so abstract that they hardly provide valuable hypotheses for the cases under observation, whereas in the latter case, specific theories are meaningless if applied to all the cases of the basic population.

The theoretical foundations on which research in the field of school-to-work transitions is based, therefore, remain eclectic (Raffe 2008). Researchers typically borrow theoretical pieces from different disciplines and neighbouring research fields, such as economic labour market theories. For example, human capital theory is used for explaining the effects of educational credentials on labour market outcomes. But since this theory is mainly focussed on the individual level, it is hardly able to explain institutional effects on the situation of school leavers. Segmentation theory, in its original version, assumes the existence of two segments within the labour market – a primary sector and a secondary sector – which differ in terms of wages and employment characteristics, but there is no mobility between them (Doeringer and

Piore 1971; Edwards, Reich et al. 1975; Reich 2008). In later variants of this theory, certain groups, among them youth and school leavers, were identified that constitute labour market segments of their own. However, even though this theory does include the institutional level, it does not allow for explaining country differences (Ashton 1988). Very close to the original segmentation theory is Marsden's dichotomy of internal vs. occupational labour markets (Marsden 1990; Marsden 1999), which is frequently used in school-to-work research as well. It assumes that the situation of young labour market entrants depends to a large extent on the fact that labour markets are structured either internally or occupationally. However, recent studies have questioned the explanatory power of this dichotomy (Gangl 2003b; Brzinsky-Fay 2007).

Additionally, some researchers have employed power resources approaches such as insider-outsider theory (Lindbeck and Snower 1989), which, while closely related to segmentation and ILM-OLM theory, refers primarily to the political origins of certain groups being disadvantaged regarding labour market access or employment conditions. The argument here is that those who already have jobs – the insiders – are organised in employee organisations and have advantages over those who are outside the labour market – the outsiders² – when it comes to negotiating their wages and working conditions. In the long run, the situation of the outsiders – and school leavers are by definition outsiders – deteriorates remarkably. But again, the insider-outsider theory has not been able to explain country differences in a satisfactory way.

As a consequence of this lack of a theoretical framework for school-to-work transitions, fixed definitions of the key concepts that are usually applied in transition research, such as *transition* or *trajectory* (cf. Brzinsky-Fay 2010: 7), do not exist. The term *transition* should be understood here as the most general expression in order to describe a change between an initial status and a destination status. The duration of a transition is not determined explicitly; it can be a very short status change or a prolonged process that involves many status changes until the destination is reached. Regarding school-to-work transitions, it can be assumed that they become increasingly protracted and involve many status changes; as a result, transitions must be examined in a longitudinal way (see section 2.4). The term *trajectory* represents a more structuralist view, implying that “labour market destinations were largely determined by social forces” that are “outside of the control of individual social actors” (Evans and Furlong 1997: 18). One can understand trajectories as normative transitions arising from certain institutional arrangements.

The above list of theories employed by school-to-work researchers is far from being complete, but it illustrates the fact that neither classical labour market theories nor institutional approaches have been able to serve as theoretical frameworks providing

² Analysing Eurobarometer data, Rueda (2005; 2006) showed that even social-democratic parties, despite their egalitarian attitude, have incentives to pursue insider politics, whereas Emmenegger (2009) found the contrary to be true when using data from the International Social Survey Programme (ISSP).

sound explanations for the striking differences between countries regarding both in terms of institutional settings and individual outcomes. Therefore, the questions that have to be answered are “How do institutional frameworks influence school-to-work transitions?” and “How are the effects of individual characteristics on school-to-work transitions affected by institutional frameworks?” Theoretical answers to these questions can only be obtained by including as many countries as possible (cf. Bynner, Chisholm et al. 1997: 6), by analysing the conjunctural effects of institutions, and by consistently applying longitudinal designs.

2.2. Persisting Differences despite Globalisation

“Despite pressures for cross-national convergence arising from modernisation, globalisation and shared policy discourses, the processes and outcomes of education-work transitions continue to vary widely across countries.”

(Raffe 2008: 277)

The ongoing process of the international integration of economic and societal systems brought a number of researchers from different theoretical backgrounds to the hypothesis that an assimilation of institutional systems or a convergence of policies was about to take place. This notion can be found among classical industrialisation and modernisation theorists (cf. Collier and Messick 1975; Eyestone 1977) or among neo-institutionalists (cf. DiMaggio and Powell 1983; Powell and DiMaggio 1991).³ They presume the integration of economies to lead to identical demand structures within economic and political systems, while internationalised communication structures enhance policy exchange beyond national borders. As a result, convergence processes between national systems take place, rendering institutional systems identical in the long run.⁴ As a matter of fact, the European Union features both a highly integrated common economy and arguably the most elaborate and institutionalised model of cross-border policy exchange, namely the Open Method of Coordination (Borrás and Jacobsson 2004; Zeitlin and Pochet 2005), whose objective is to induce and accelerate this process. By evaluating national policy initiatives, recommending best practices, and formulating common targets (benchmarks) for labour market outcomes, mutual learning processes are encouraged.

However, in recent decades, convergence has not been observable at all with respect to school-to-work transitions. In addition to diverging institutional frameworks, the

³ In this respect, neo-institutionalism is not consistent. For an overview and further discussion, see Hall/Taylor (1996).

⁴ The abovementioned theories usually do not distinguish between the ‘convergence of institutions’ and the ‘convergence of outcomes’. The fact that outcomes might diverge despite of converging institutions remains an open question that theorists have failed to address.

“existence of national transition patterns challenges predictions of convergence” (Raffe 2008: 278). Neither a convergence of institutional frameworks nor a convergence of outcomes is apparent. National differences in the pathways of school leavers persist not only in the OECD but also within the European Union, where the integrating forces towards common outcomes are particularly strong. In the present dissertation, the lack of convergence in the field of school-to-work transitions is not analysed regarding its origins. Instead, the mechanisms of institutional variation and individual outcomes will be assessed to answer the question, “Why are the differences in outcomes remaining?” and, “Why do single institutions survive even if there is a pressure towards convergence?”

2.3. Analysis of Regimes as Complementary Institutions with Conjunctural Effects

“To talk of ‘a regime’ is to denote the fact that in the relation between state and economy a complex of legal and organisational features are systematically interwoven.”

(Esping-Andersen 1990: 2)

Within the past two decades, social scientists have increasingly paid attention to societal regimes that are presumed to have effects on individual behaviour. The most important exponents are Esping-Andersen’s *Three Worlds of Welfare Capitalism*, which is focussed on welfare institutions, their outcomes and their reformability (Esping-Andersen 1990; Esping-Andersen 1999), and Hall and Soskice’s *Varieties of Capitalism* (VoC) – the prevailing theory concerned with the socioeconomic relevance of institutions and institutional regimes for economic performance, a theory that also considers the employment system and the education system (Hall and Soskice 2001b).

The VoC approach assumes that capitalist economies can be distinguished according to their mechanisms of economic coordination and that crucial institutions are complementary and, therefore, relatively stable. Regimes – defined as institutional systems – comprise the relevant spheres of industrial relations, the vocational education and training system, corporate governance, inter-firm relations and their relations with their own employees (Hall and Soskice 2001a). As a result, a lot of possible combined effects should be within the scope of this approach. However, in the end, all the different possible combinations of institutional specificities cumulate in two types of political economies: co-ordinated market economies (CME) and liberal market economies (LME).

In *Three Worlds of Welfare Capitalism*, Esping-Andersen presents a typology of welfare regimes, which differ in their ability to cope with the challenges of economic structural change, increasing female labour participation, and demographic change. The political articulation of different social classes and path dependencies lead to diverging notions of welfare provisions. The degree of decommodification – that is,

the degree of citizens' reliance on the (labour) market – constitutes the distinctive characteristic of the welfare systems. In its original form, Esping-Andersen's work identified three ideal types of welfare states (social-democratic, liberal, and conservative); later on, however, he had to differentiate these types because of critiques regarding the misspecification of the typology (cf. Arts and Gelissen 2002).

What both approaches (and other regime approaches) have in common is that they assume institutions to unfold their effects on individual behaviour in combination with other institutions. That means that it is not one single institutional characteristic that causes a certain individual effect, but rather a combination of institutional characteristics. This is very much in line with the societal approach (Maurice, Sellier et al. 1986), which emphasises holistic interrelationships among social and economic institutions, as described by Raffe (2008: 278): "These interrelationships generate different national 'logics' and a degree of coherence within each country."

Put in methodological terms, the effects of institutional configurations are not additive, but conjunctural (King, Keohane et al. 1994: 87). Additive causality means that each cause is independent of the other causes, adding something new to the explanation of the effect. Conjunctural causation, in contrast, includes two additional aspects (Aus 2009). First, complex causality is characterized by equifinality, which means that different causal pathways lead to the same outcome. Second, the combination of different causes has different effects depending on their combination. This includes the case that single causes have a certain effect on an outcome, but if combined with another cause, the effect disappears or changes its direction (see section 6.4). Two requirements need to be met in order to perform a comprehensive analysis of conjunctural effects: an appropriate number of countries under observation and a methodological tool that allows for the analysis of complex causality.

The first requirement is related to the general critique directed towards research on school-to-work transitions, namely that causal generalisations are based on too few cases. As Kerckhoff mentions, "if sufficient information can be obtained about enough other industrial societies, it may be possible to construct a more sensitive set of types and thereby increase our understanding of the role of the organization of educational systems in the social stratification process" (Kerckhoff 2000: 469). The second requirement calls for an appropriate method to identify such conjunctural causalities. Whereas classical regression models are based on additional causality – each additional independent variable is supposed to add explained variation to the dependent variable – Qualitative Comparative Analysis (QCA) operates by combinatory models and, therefore, is suitable for this kind of analysis (see section 5.2).

In contrast to their theoretical claims, the VoC approach and the other regime typologies rely largely on regression analysis and its underlying concept of additional causality. Esping-Andersen, for example, tries to estimate the impact of labour market regulation on several labour market outcome indicators – such as unemployment, relative youth unemployment, and low-skilled unemployment rates (Esping-Andersen 2000: 81). Although he spent most of his scientific efforts in the

examinations of regime effects, he only applies regression analysis, with its notion of additive causality.⁵ Efforts to come up with satisfactory ways of studying the complex causalities between institutional configurations and individual outcomes are in their infancy and, regarding the field of school-to-work transitions, non-existent. This dissertation aims to close this gap by trying to answer the question, “Are there conjunctural effects of institutional configurations (regimes) on school-to-work transitions?”

2.4. Longitudinal Analysis of Transition Processes

“It is important to recognize that the transition is a process that occurs over time. The initial education-occupation association is not necessarily equally meaningful in all cases.”

(Kerckhoff 2000: 463)

In general, measuring transitions means capturing a process with a specific time dimension, the extent of which needs to be determined by the research question, or by data availability. The classical analysis of labour market transitions focuses on a single status change, for instance between employment and unemployment, which has to be described as a time point. As longitudinal datasets become increasingly available, the periodical character of transitions deserves attention, mostly in terms of studies that use event history models. But even these kinds of studies continue to define transitions as single status changes: as they look at the conditions and/or effects of these changes, the transition itself remains a time point. There have only been very few attempts to use longitudinal data to look at transitions and treat them as periods or sequences composed of more than one or two statuses (Berger, Steinmüller et al. 1993). The concrete measures that aim at describing characteristics of school-to-work transitions are located at the aggregate as well as at the individual level, and all of them have certain shortcomings. Whereas cross-sectional data are used for the calculation of aggregate measures, longitudinal data are employed predominantly for the individual measures.

At the aggregate level, the quality of school-to-work transitions is measured by classical indicators such as youth unemployment rate, employment rate of young people, or average entry wages. Within the last decades, the OECD developed an extensive body of aggregate-level indicators beyond this classical measure (cf. OECD 2010b). The transition period is often calculated by taking the duration between the school leaving age – referring to the average age at which 50 per cent of an age cohort have finished school – and the median job entry – defined as the age at which the

⁵ Apart from that, his analyses are based on only 20 cases, which makes the (non-significant) results at least questionable. For a comprehensive discussion about Esping-Andersen’s methods, see Shalev (2007) and the discussion in Mjøset and Clausen (2007).

employment-population ratio reaches 50 per cent. In the repeated measurements within comparative report designs across approximately 30 OECD countries, these indicators comprehensively outline an accurate empirical picture of school-to-work transitions in each country studied. However, cross-sectional data that, in addition, is aggregated at the country level (or at the level of particular groups, such as migrants) can be used to analyse aggregate (institutional) effects on aggregate outcomes, but it cannot properly reflect transitions as individual processes. For example, both the unemployment rate and the youth employment rate as classical labour market indicators disregard the role inactivity plays within the transition process. In order to account for inactivity, the so-called NEET indicator was employed to provide a comprehensive description of joblessness by calculating the share of young people that are “neither in education nor in employment or training” (cf. Furlong 2006; Quintini, Martin et al. 2007; Inui 2009). However, even a smart but cross-sectional indicator like this does not tell us anything about the role inactivity plays within individual labour market entry careers; nor does it explain whether or not the incidence of inactivity might have structural rationales.⁶

At the individual level, the very basic indicator is the first transition into employment, which – as the quotation at the beginning of this section suggests – is not necessarily meaningful. In order to circumvent this problem, researchers have tried to detect the crucial status change by accurately constructing concepts such as the “first significant job” (Russell and O'Connell 2001; Korpi, de Graaf et al. 2003) that lasts at least six months, or the “first job after leaving school for the last time” (e.g. Arum and Hout 1998), for example. This limitation serves the purpose to exclude very short, probably erratic employment periods that are of secondary relevance. However, the determination of the time period that has to be regarded as “not significant” remains to a large extent arbitrary – a problem that cannot be eliminated even by increasing the quality of available data. Kerckhoff explains that “[...] the problem of defining the first job becomes the most troubling when studies are based on the very best possible longitudinal data” (2000: 471).

Synonymous to the transition to employment, the unemployment duration of school leavers is also taken as an indicator to describe the quality of the transition (cf. Müller and Gangl 2003), but for the same reasons, the validity of such an indicator seems questionable. The duration of unemployment after leaving school is an indicator that simultaneously measures the duration of search processes and the general availability of jobs on the (youth) labour market. It is therefore determined by both institutional frameworks and business cycles. Apart from their arbitrariness, both measures have the main disadvantage of seeking to qualify school-to-work transitions by focussing on only one single status change, which in this case is a passage from unemployment to employment. Other labour market statuses – such as inactivity (military service, household and childcare activities) or education beyond

⁶ For a comprehensive overview of the disadvantages of cross-sectional data in contrast to longitudinal data in general, see (Blossfeld, Golsch et al. 2007: 4).

compulsory schooling – are disregarded, and it is not clear if the school-to-work-transition period ends with the first incidence of employment. Transition periods involving more than one employment episode are very different from those showing continuous employment regarding both their nature and their impact on future employment prospects. Since there is much evidence to suggest increasing volatility in labour market entry processes (Berger, Steinmüller et al. 1993), the transitions of young people become more complex with each new cohort. But because this process takes place in every industrialised country, the difference in the effects of institutional arrangements on individual school-to-work transitions can only be assessed by taking this complexity into account across time – that is, by applying longitudinal indicators to longitudinal information.

Apart from these obvious and simple indicators, other, more elaborate individual-level measures are used, for example the risk of working in a fixed-term job (cf. Scherer 2004; de Vries and Wolbers 2005; Gebel 2009). Fixed-term employment, on the one hand, is seen as a flexible, more risky form of employment that allows employers to screen new employees while at the same time keeping the flexibility to lay them off when either the economic situation requires retrenchment or the qualification or performance of the young employee doesn't meet enterprise standards. On the other hand, fixed-term contracts imply a shift of economic risk towards labour market entrants in terms of decreasing employment security. A (theoretically) fair balance should involve a trade-off between firm flexibility (providing the opportunity to create more jobs) and the employment prospects of labour market entrants (fixed-term employment as a “bridge” rather than a “trap” (Gash 2008). Apart from these theoretical and political implications, the indicator of fixed-term employment risk, like the aforementioned indicators, only makes sense if observed and analysed in a longitudinal perspective.

Considering school-to-work transitions as periods that involve more than one single status change also helps avoid certain problems inherent to the comparative analysis of different school-to-work transition systems: for example, the definition of what has to be regarded as “education” or “work”. This is particularly true of systems with established apprenticeship systems, as Kerckhoff (2000: 463) states: “[...] a decision has to be made as to whether the period spent in the dual system is time in school or at work. That is, does the transition from school to work take place before or after the period in the dual system?” Another problem for comparative analysis results, for example, from the difference of countries regarding the degree of coordination between education and labour market. When comparing Germany and the United States, Kerckhoff (2000: 465) mentions that multiple entries into the labour force are common in the U.S., but not in Germany. Paying attention only to the first status change between education, unemployment, or inactivity on the one hand, and employment on the other, means overestimating the integrative potential of the transition system in the U.S., because later exits and re-entries into employment remain disregarded.

Despite the fact that, taken together, all of the individual-level indicators provide the possibility to analyse school-to-work transitions in a comprehensive way, they all suffer from the same “time point” problem. It can be assumed that both the

frequency and the nature of the status changes within the school-to-work transition period vary from one country to another. Therefore, a transition analysis that refers only to one single status change most probably leads to biased and false conclusions. Shanahan (2000: 683) lists a couple of problems arising from researchers' decision to limit their analysis of the pathway from youth to adulthood to such "life course markers". One of these problems is the attempt to capture the whole transition process by means of one single event or "marker". To address these problems, Shanahan suggests a couple of methodological innovations, one of which is sequence analysis. Capturing the school-to-work transition process as a whole and establishing a valid and reliable comparative analysis indeed requires a methodological tool that uses the potential of longitudinal data and is capable of dealing with the complexity of the transition process.

Apart from these rather "practical" questions of how to measure and quantify a time process, the question arises whether improving data quality has any effects on methodological and theoretical development. One can observe a three-dimensional increase in the size of datasets: First, the number of cases increases because of progress made in survey methodology and the evolving expertise of survey institutions. Second, the number of variables increases because of the refinement and growing complexity of research questions. And third, the number of time points for which observations and variables are available increases because of the growing availability of longitudinal datasets (and their persistence). This requires more and more the application of algorithmic explorative methods capable of sorting information in meaningful ways to help explore crucial factors and avoid their drowning in a random noise. The effects on theoretical development are harder to estimate. It can be assumed that the emergence of wide-range theories will decrease in favour of specialised short-range theories, because the more complex the object of investigation becomes, the more difficult is the search for theoretical generalisations. However, this problem requires further discussion, which is beyond the scope of this dissertation, but the innovative methods applied here clearly point into this direction. In the context of this dissertation, one need to address the question of how transition processes can be captured and explored in order to extract crucial commonalities and/or differences in the individual pathways between school and the labour market.

3. School-to-Work Transitions Research: State of the Art

The research on school-to-work transitions differs remarkably among the various social sciences. Sociologists, economists and political scientists approach this topic from different viewpoints, and integrative processes can hardly be observed. Additionally, the comparative perspective can only be found in sociology and economy, whereas political scientists do not even examine school-to-work transition policies.

3.1. Sociological approaches

Sociologists are fundamentally interested in youth issues, because processes of social reproduction and the emergence of social inequality take place in the early years of life. Therefore, sociological research on school-to-work transitions is focused on studying social mobility.⁷ Education (and the education system) is seen as society's "sorting machine" (Spring 1976), redistributing the chances of upward and downward mobility across generations. Therefore, sociological school-to-work transition research is embedded in the field of social stratification and concentrates on three major aspects (Kerckhoff 2000: 462-3): first, the strength of the association between educational attainment and entry-level jobs; second, changes in educational attainment after the first job; and third, the degree of occupational mobility during the early career. Apart from that, another important sociological research stream must be added: one that explores the nature of transition pathways.

One of the most important contributions to comparative sociological stratification analysis regarding school-to-work transitions came from Shavit and Müller (1998). They compared case studies from thirteen countries⁸ using a common research design. These country case studies focus, first, on the analysis of qualification level effects on occupational status and on class position. Qualification level, as the independent variable in this relationship, is measured by the CASMIN scheme (cf. Brauns, Scherer et al. 2003), whereas the dependent variables – occupational status and class position – are measured by an occupational prestige scale (Treiman 1977) and EGP class scheme (Erikson and Goldthorpe 1992). In addition to these micro-level analyses, Shavit and Müller examine the effect of certain institutional characteristics of education systems on individual variables. They use the level of standardisation, the level of stratification, and the degree of vocational specificity as institutional dimensions. Moreover, they test the influence of the size of the cohort

⁷ Of course, sociological youth studies also include the broad field of ethnographic research on topics such as youth culture, family relations, identity formation, or deviant behaviour. In each of these fields, young people pass through particular transition processes, which deserve (and receive) scientific attention. However, a detailed description of these research fields is beyond the scope of this dissertation (for in-depth overviews, see Bynner, Chisholm et al. 1997; Furlong 2009).

⁸ The countries under observation are Australia, the United Kingdom, France, Germany, Ireland, Israel, Italy, Japan, the Netherlands, Sweden, Switzerland, Taiwan and the United States.

entering post-secondary education on the association of education and occupational status and class position. Apart from standardisation, where only limited and uncertain support for its effect on the association between qualification and occupational status can be found (Müller and Shavit 1998: 38), all of the other characteristics of educational systems show the expected effects. A high degree of stratification is found to have positive effects on the association between qualification and occupational status or class position. The same is valid for a high degree of vocational specificity (Müller and Shavit 1998: 39). These results featured a couple of additional insights, out of which the high correlation between stratification and vocational specificity is of special interest for my fourth article (section 6.4). However, the path-breaking work of Shavit and Müller suffers from having a strong “juxtaposed case study” character, because despite the common research design, each of the country chapters has a slightly different focus.

This shortcoming was addressed in the work of Müller et al. (2003), who used European data sources – namely the European Household Panel (ECHP) and the European Labour Force Survey (ELFS) – for real comparative analyses. This work was done as part of a large-scale European research project called CATEWE (“A Comparative Analysis of Transitions from Education to Work in Europe”), and the main questions were:

- 1) Do youth transitions vary between European countries, and if so, how and to what extent?
- 2) How do structural and institutional differences affect school-to-work transitions in different countries?
- 3) Are transition processes evolving towards a common structure or not (convergence)?

Using comparative data, they were able to classify countries according to their institutional characteristics (Gangl, Müller et al. 2003). In their view, the crucial institutional dimensions could be represented by a continuum between countries with occupational labour markets (OLM) and those with internal labour markets (ILM) (Marsden 1990; Marsden 1999). In fact, there are several indications that confirm the relevance of this labour market characteristic, but on the other hand, it is questionable whether all of the institutional variance among European countries can (or should) be captured by one single dimension (see sections 2.3 and 6.4). Despite making some very good points on the institutional effects on school-to-work transitions (Gangl 2003a; van der Velden and Wolbers 2003), the comprehensive approach of this project neglects an important institutional dimension: the authors do not answer the question of how institutions interact and produce certain individual effects only within a certain configuration.

Apart from these research projects that represent the confirmatory tradition, there are some efforts exploring school-to-work transitions that are most suitably represented by the so-called “pathway approach” (Raffe 2003; Raffe 2008). The basic notion is that there are typical transition patterns that are shaped by institutional arrangements. To

draw conclusions about the relation between the extent of individual leeway in decision-making and institutional predetermination, the pathway approach looks at the openness or exclusiveness of these trajectories. It has been criticised for its linearity, economism and individualism (Dwyer and Wyn 1997; Evans and Furlong 1997; Cohen and Ainley 2000). Criticism concerning linearity refers to the fact that the pathway approach ignores the complexity of the transition process and assumes that all transitions go into the same direction. School-to-work transitions may be erratic and involve frequent back-and-forth changes between statuses, which are not explained by the pathway metaphor. But, as Raffe (2003: 16) argues, the pathway concept is “neither a theory nor a rigorous analytical tool” and, therefore, open to extensions that involve more complex transitions.⁹ By using sequence analysis as a tool to classify individual transitions (see section 5.1 and 6.2), researchers become able to go beyond the limitations of examining pathways in a simplified manner. The criticism of economism means that the pathway approach has a singular focus on labour market transitions, while neglecting the other important transitions young people have to pass through – such as family and household formation or partnerships. This reflects data limitations, because hardly any dataset contains longitudinal information on labour market status, marital status and family situation in parallel. The last (and most severe) criticism concerns the apparent failure of the approach to connect the pathways with their socioeconomic determinants. It is argued that the description of pathways suggests that they are equally open to all individuals who choose to pursue them. This criticism can easily be addressed by conducting research that puts certain pathways in relation to certain socioeconomic factors, as is done in the third article of this dissertation (see section 6.3).

Another stream of sociological school-to-work transition research is concerned with processes of social exclusion. These studies have in common that they aim to go beyond employment issues when examining the effects of social exclusion, even if they agree that employment plays a central role in integration processes. Kieselbach (2000) compares six European countries¹⁰ regarding their youth unemployment profile and the risks of being excluded from societal participation. Despite its international approach, the qualitative analyses remain purely descriptive, and the whole research project is very much a “juxtaposed case study”. The same is true of Bradley and van Hoof (2005), whose work has a different thematic and geographical¹¹ focus, but only features qualitative and quantitative country descriptions.

⁹ Furthermore, the problem of linearity is to a large extent the result of limited data availability. Most of the longitudinal datasets do not contain very detailed information on transitions.

¹⁰ The six countries under observation within this research project “Youth Unemployment and Social Exclusion: Objective Dimensions, Subjective Experiences, and Innovative Institutional Responses in Six European Countries (YUSEDER)” were Belgium, Sweden, Germany, Greece, Spain and Italy.

¹¹ The countries covered in this study are a number of European countries, and the chapters are organised as country studies or as comparative studies.

The second approach within the social exclusion approach is characterised by a more integrated research design that is a common comparative survey (Hammer 2003). The relation between socioeconomic characteristics and labour market position is the key question here, which is operationalised by examining how the employment situation of unemployed young people changes under certain conditions, such as economic situation, programme participation, or health conditions. However, despite its integrated approach regarding data and research question, this study has crucial limitations. First, the chapters diverge widely with respect to country selection and methodology, and second, it is a cross-sectional study that can only partly describe youth integration processes.

Two further contributions went beyond the descriptive and “juxtaposed case study” approach: Walther and Stauber’s (EGRIS 2001; Walther and Stauber 2002) research project has the interesting objective of making policy recommendations based on intercultural discourse among a group of country experts describing misleading trajectories in their respective countries. After implementing feedback loops among researchers as their scientific method, the authors identified national institutional systems, ideological discourses among political actors, and young people’s subjective perceptions regarding their decisions during the school-to-work transition period. Walther and Stauber described their project as a “process of intercultural exchange, rather than as a comparative study in a conventional sense” (Walther and Stauber 2002: 22). Hence, they discussed a number of concepts and theoretical issues in a purely qualitative way. Unfortunately, this process remains limited to this conceptual, sometimes normative stage, and is not connected to further hypothesis-testing studies, neither by the original research team itself, nor by other researchers. The project’s conceptual starting point, therefore, is not brought to a satisfying close, with policy recommendations remaining at a very general level, and its comparative character remaining at an underdeveloped level.

Closely related to this last stream of sociological research is the examination of scarring effects of early unemployment on people’s later employment career. This aspect has attracted the interest of sociologists concerned with stratification and inequality research because the occurrence of unemployment in the early career constitutes a “trigger event” (DiPrete and McManus 2000), which is seen as one potential source of inequality dynamics (Hammer 1997; Layte, Levin et al. 2000; Gangl 2004; Gangl 2006).

3.2. Economic approaches

Economists interested in school-to-work transitions mostly analyse (labour) market mechanisms, particularly those of matching labour supply and demand, and – within the field of education economics – the returns to education. Apart from that, evaluation research became a domain of econometric research, which allows for analysing programme outcomes against the background of categories typical of economic thinking, such as efficiency. Economists target the allocation processes and price mechanisms (wages) on labour markets, they tend to favour micro-economic approaches, and apply comprehensive econometric methods to individual data in order to evaluate active labour market policies. By this means, they contributed

decisively to theory building in these areas – for example, signalling theory or human capital theory (cf. Dolton, Asplund et al. 2009). Another field of economic research regarding school-to-work transitions refers to scarring effects of (early) unemployment (Ellwood 1982; Ruhm 1991; Narendranathan and Elias 1993; Arulampalam 2001; Gregg 2001; Kletzer and Fairlie 2003; Nordström Skans 2004; Mroz and Savage 2006; Bell and Blanchflower 2010). Negative effects of unemployment include future earnings losses, lower job quality and higher unemployment risk. Together with the sociological findings, these results provide an important justification for policies that aim at facilitating smooth labour market integration for young people.

The economic approach has two major shortcomings, of which the first is the lack of an integrating systemic perspective, while the second concerns the lack of data for a large group of countries, namely Eastern European and developing countries. Relying on a positivist theoretical view and a probabilistic methodological toolbox means that a couple of questions cannot be answered. The most prominent example used for illustrating the limitations of probabilistic hypothesis-testing methods is the so-called small-N problem (see e.g. Lieberman 1991; King, Keohane et al. 1994; Coppedge 1999; Goldthorpe 2000; Ebbinghaus 2005). Not having enough cases in relation to the variables of interest makes this method useless for comparing countries. In contrast, within-country analyses of transition processes, in which the individual is the unit of analysis, are quite plausible, but in order to assess country-specific, institutional effects properly, one would need a large sample of countries, which is not available – not only because of the lack of appropriate data in single countries.¹²

This leads to the other shortcoming of the (micro-)economic approach: the lack of an integrated systemic perspective. Because probabilistic methods are not able to make inferences about a small number of cases and because the causality concept behind these methods is one of additive causality (cf. King, Keohane et al. 1994), the complex interrelations of institutional characteristics cannot be captured appropriately. This is particularly true of the field of school-to-work transitions, because one has to take into account two systems: the education and the employment system. Here, one can find the major reason for the absence of a school-to-work transition theory (section 6.4).

However, the (micro-)economic approach has the advantage of having clear-cut objectives and theoretical foundations. As a consequence, it offers a highly developed, sophisticated methodological toolbox for analysing labour market processes. Yet this interest remains very restricted, because labour markets are mainly social institutions and, moreover, strongly interrelated with other social institutions. Some political economists have acknowledged this fact by seeking to

¹² Of course, there are variants of probabilistic methods that aim to circumvent the small-N problem, such as pooled cross-sectional time-series analysis. But again, other serious problems can be seen to emerge (Kittel 1999).

broaden the economic scope, primarily reflected in the “varieties of capitalism” school, which is discussed in section 4.1.

3.3. Policy-focussed Research

Political scientists have largely failed to analyse school-to-work transitions. Providing policy recommendations is no longer the exclusive domain of political science; such recommendations are usually made by all kinds of social science projects. The traditional interest of political science as a discipline is in analysing political programmes from an explicitly normative perspective (cf. Groth and Maenning 2001), discussing integration processes against the background of theories of (classical) political economy¹³ and class conflicts. Despite the sharp increase in policy analyses in general, the field of education policy remains somewhat under-researched within political science. However, in the past two decades, two new strands of research have emerged: first, a comparative historical political economy approach, which examines the emergence and persistence of institutions (cf. Thelen 2004) and analyses how institutional frameworks influence individual behaviour, and second, the numerous research activities of the OECD and, in the European context, the European Union – research designed to examine statistical data in order to distil comprehensive policy recommendations. While the former approach is theoretically focussed on questions of institutional change, the latter possesses a pragmatic perspective and is to a remarkable extent based on economic theories.

Thelen’s (2004) main theoretical focus is not on policies, but on the emergence and the evolution of institutions, or more precisely, of national systems of vocational training. From different historical contexts, diverging power constellations, and a variety of actors’ interests, she reconstructs the historical roots of the contemporary vocational training systems in Germany, Japan, the United States and Britain. Her main theoretical argument is that there is no dichotomy between institutional change and institutional reproduction, but that both are historically intertwined. Thelen’s work reflects the outstanding development of institutionalist theory in the field comparative politics in general. Methodologically, her subtle analysis is limited to comparative case studies (which is the only method available for making such analyses of historical institutional development).

Apart from their research, international organisations such as the OECD and the EU have a mainly pragmatic and policy- or benchmark-driven interest in analysing school-to-work transitions. Both organisations aim at enhancing or stimulating the formulation of policies by their respective member countries to promote social and economic development. Whereas in the EU concrete political benchmarks were

¹³ In this context, the term *political economy* is associated with the “old” political economy, which refers to the origins of theoretical analysis of capitalist market economies in the nineteenth century. In contrast, the “new” political economy refers to a sub-discipline of modern economics, which uses econometric modelling techniques to analyse political processes (cf. Saint-Paul 1996; Saint-Paul 2002).

formulated and agreed within the European Employment Strategy, the OECD follows a self-defined agenda. The EU approach consists of the binding effect of the benchmarks and the subsequent evaluation of the policies the member states have chosen. A peer-review process is used to identify best practice examples that could be adopted by other member states. The OECD mainly conducts comparative country studies, while recommending concrete national policy goals. Both the OECD and the EU use country comparisons as a competitive incentive to encourage societal change.

Research on school-to-work transitions faces two challenges. First, transferring a policy identified as a best practice example from one institutional system to another is not a simple task, because the effectiveness of policies is influenced significantly by their institutional framework. That means that the same policy can have desirable effects in one country and little to no effect in another. The challenge for social research here is to identify the institutional determinants that make some policies work or fail, which certainly constitutes the major policy interest (Raffe 2008: 279). The second challenge is closely linked to the first, because it concerns the problem of how to capture institutional regimes and how to identify the crucial combinations of institutional regimes. This problem is discussed in sections 5.2; an attempt to break new ground in these terms is presented in section 6.4.

4. Theoretical Considerations

In the absence of a theory that explains the effects of certain transition systems on school-to-work transitions, one needs to stress, on the one hand, general institutional theories that provide hypotheses about how institutions shape individual outcomes, and, on the other hand, labour market theories that specifically explain the effects of single institutional elements. In that sense, “transition-system research often appears theoretically eclectic and fragmented” (Raffe 2008) indeed.

4.1. Institutional Theories

In the tradition of the “New Institutionalism”, a number of different approaches may be distinguished. They all share the assumption that “institutions empower and constrain actors differently and make them more or less capable of acting according to prescriptive rules of appropriateness” (March and Olsen 2006: 3). Or, as Hall and Taylor note, institutional approaches “seek to elucidate the role that institutions play in the determination of social and political outcomes” (Hall and Taylor 1996: 936). Different approaches of institutionalism differ in the way they understand the nature of institutions, the processes in which they affect actors, and the processes in which the feedback of actors’ behaviour translates into a change of institutions.

According to Hall and Taylor (1996), three distinct “new institutionalisms” have emerged since the 1980s:¹⁴ historical, rational choice, and sociological institutionalism. Historic institutionalism emphasises the importance of initial decisions and choices of venues for subsequent actions. It introduces notions such as path dependency (Pierson 2000) or political inheritance (Rose 1990) to describe these phenomena. Rational choice institutionalism emphasises individual interactions in order to understand institutional effects. In this view, institutions have an instrumental function for individuals using these institutions for maximising their utility. Finally, sociological institutionalism puts its focus on the normative level of institutional values and the cultural context which institutions represent, as well as on how individuals and their decisions are embedded in this structure. Recently, a fourth institutionalism was proposed to be added to the triad of institutional approaches: “discursive institutionalism” (Schmidt 2008; Schmidt 2010). This variation on institutionalist approaches concentrates on the role discourses play for political decisions and for the change of institutions.

The most influential theoretical approach within the institutionalist school is Varieties of Capitalism (Hall and Soskice 2001b). It encompasses many notions of the institutionalist approaches described above, focusing on product markets as well as labour markets, the education system, enterprise organisations, and the government level. Specific coordination mechanisms – the VoC approach distinguishes between

¹⁴ There have been multiple attempts to review different approaches of institutionalism, such as Goodin (1996) or Peters (1999). A detailed discussion of all of them would surely go beyond the scope of this introduction.

coordinated market economies (CME) and liberal market economies (LME) – provide different incentives to firms, which in turn lead to different comparative advantages regarding the production of certain commodities and the provision of social benefits. Hence, the VoC approach contradicts the notion that globalisation leads to a convergence of political and economic institutions and emphasises the “variety” of capitalist economies. However, in the end, all of the different possible combinations of institutional specificities cumulate in two types of political economies: CMEs and LMEs.

Regarding education institutions, the VoC approach argues that social protection is complementary to different skill equilibria. Because firms' product market choices are constrained by the availability of necessary skills, they only invest in specific skills if social protection institutions – operationalised as employment and unemployment protection – safeguard their returns. If these institutions are not available, employers and employees are more likely to invest in transferable skills (Estevez-Abe, Iversen et al. 2001). Hence, the extent of social protection determines the skill profile of a given economy.

The operationalisation of a comparative analysis under the condition of diverging institutional frameworks requires an adequate definition of institutions. Within the VoC approach, institutions are seen in the same way as North sees them (1990: 3-4), namely as “humanly devised constraints that shape human interaction” and that “define and limit the set of choices of individuals”. In a second step, it is necessary to distinguish institutions, which have a long persistence, from policy programmes, which are of limited duration. Of course, a policy programme may become institutionalised if it is retained for a longer period. The longer a policy programme remains unchanged, the more inert it becomes. Retention effects begin to emerge that make it difficult for policymakers to abolish the policy, because actors have come to rely on it (Pierson 2000). In the political science literature, these effects are described as policy inheritance (Rose 1990) or path dependency (Pierson 2001). As North (1990) says, they “narrow conceptually the choice set and link decision making through time”. Hence, the distinction applied here between institutions and policy programmes builds mainly on the attributes of duration and changeability. This is in line with the institutionalist perspective:

An institution is a relatively enduring collection of rules and organized practices, embedded in structures of meaning and resources that are relatively invariant in the face of turnover of individuals and relatively resilient to the idiosyncratic preferences and expectations of individuals and changing external circumstances.

(March and Olsen 2006)

Policy programmes differ from institutions only with respect to duration and resilience. Programmes are implemented by governments formed by a single party or a coalition of parties. Therefore, they reflect partisan preferences and belief systems that favour a specific solution for a given problem. If government changes, a different belief system is likely to replace the policy programme with a different one,

because the former is not resilient to the idiosyncratic preferences of the new government. If a programme survives multiple government changes, it becomes an institution.

In the third paper of this dissertation, institutional characteristics are captured by the introduction of country dummy variables, which exhibit larger effects than the individual covariates (section 6.3). That means that there is a considerable effect of the institutional system on individual transition outcomes (cf. Raffe 2009). As a consequence, in the fourth paper, specific institutional characteristics of the education system and labour market are included as independent variables in order to examine conjunctural effects of institutions on school-to-work transition outcomes (section 6.4).

4.2. Labour Market Theories

It is not only the institutional theories mentioned in the previous paragraph that provide incentives to examine institutional effects. The empirical picture of school-to-work transitions also continues to vary significantly across countries, so that national or institutional factors remain an important issue. Country variations “cannot all be attributed to differences in countries' economies or to compositional differences in young people's social or educational backgrounds” (Raffe 2008: 277). The influence of different institutional and structural arrangements on empirical outcomes is systematic, and countries can be classified along these institutional dimensions. This transition system or regime-oriented research is interesting in theoretical terms, because it challenges predictions of convergence and is capable of testing and informing a wide range of theoretical perspectives (Raffe 2008) developed by both sociologists and economists.

With these concepts of relevant institutions in mind, Smyth et al. (2001) define transition systems as “relatively enduring features of a country's institutional and structural arrangements which shape transition processes and outcomes.” Concerning the transition between school and employment, institutional arrangements of the labour market and the education system are examined. Regarding their effects, one will only find theories that explain the effects of single institutions, mainly from the field of economics.¹⁵

The neoclassical market model assumes that labour markets function in the same way as product markets, where the price mechanism ensures the satisfaction of buyers and sellers, and the market becomes cleared. Applied to labour markets, this means that a well-functioning wage mechanism serves to avoid involuntary unemployment. Labour market theories, in the first instance, aim at explaining the occurrence of persistent unemployment by focussing on specific shortcomings of the neoclassical model. Although the standard model concentrates on a particular group

¹⁵ Within economics, there is also an institutionalist school (Veblen 2007 [1899]), but this school remains marginalised and is not perceived very much in research.

of employees (i.e. labour market entrants), it does not offer an explanation for the empirical findings regarding the disadvantaged position of young people. However, some labour market theories offer explanations not only for involuntary unemployment, but also for labour market entrants' disadvantaged position. Usually, these theories start with basic assumptions of the neoclassical market model that are being violated.

The central assumption of the (commodity) market model is that the price mechanism generates the equilibrium between supply and demand. New suppliers only emerge if the market equilibrium is imbalanced. Applied to labour markets, this means that if the price (wage) increases because of a labour shortage, more individuals should decide to appear on the labour market. However, there is a constant inflow of new labour supply regardless of market (price) conditions, because every year school leavers enter the labour market. This is the first reason why young people are in a relatively unfavourable position compared to established workers.

Additionally, according to the neoclassical market model, employers and employees are supposed to be well informed about the nature of specific jobs or about the qualities of the workforce. But since the productivity of individuals depends to a large extent on the qualifications they gained before being hired, employers are left with a high level of uncertainty. Job searchers, on the other hand, only have information about the expected wage level prior to being hired, whereas other characteristics of a given position remain unclear. *Job search theory* is concerned with this situation of information asymmetry and therefore is able to explain the disadvantages faced by school leavers. Here, the rational behaviour of job searchers implies that with increasing search costs – defined as loss of income minus social transfer payments during the search process – the duration of the job search decreases. Simultaneously, the acceptable wage level also decreases with increasing search costs. Because entry wages are below average, search costs are lower for school leavers than they are for standard employees; therefore, the duration of (search) unemployment for young people is expected to be longer. This effect should be strengthened by the prevalence of rigid and high entry-level wages, because the search duration could not be shortened by accepting a lower wage, or a high income replacement rate, because this is a means of reducing search costs. In other words, job search theory implies that the higher the levels of government support, the higher the youth unemployment rate becomes.¹⁶

The fact that employers have imperfect information regarding the expected productivity of employees constitutes another disadvantage for young people. Since school leavers typically have little or no work experience, and no references from previous employment, employers face a high risk of misjudging their qualifications

¹⁶ More precisely, job search theory suggests that a higher income replacement rate goes along with a longer duration of search unemployment. But since the unemployment rate can be decomposed into unemployment multiplied with unemployment duration, this hypothesis is substantive.

and future productivity. Hence, employers will tend to avoid the high transaction costs resulting from wrong hiring decisions. This is where *signalling theory* comes into play. It provides explanations for the process of matching supply and demand on the labour market by emphasising the importance of certificates and credentials. Employers' uncertainty and the expected transaction costs are reflected in lower entry wages for young people and higher job turnover rates among young people – the so-called “job shopping” (Johnson 1978; Jovanovic 1979; Viscusi 1980). Job or qualification signals refer to an education system's level of standardisation, that is, the degree to which certificates and credentials meet the same standards and therefore provide signals to employers. In the research literature, a high degree of standardisation is considered to have a positive effect on the integration of school leavers into the labour market (Allmendinger 1989; Shavit/Müller 1998); that is, job turnover is likely to be reduced by increasing standardisation.

Another assumption of the neoclassical labour market model is the homogeneity of the workforce. But in the empirical world, employees, for example, differ in terms of their human capital (i.e. their work experience and their investments in education and training). Hence, *human capital theory* provides explanations for educational effects on the labour market in general, and for labour market entrants in particular. The higher the (individual) educational level, the better is the (individual) labour market integration.¹⁷ However, human capital theory assumes that people make educational decisions by calculating the costs of investments and the returns (mostly income) to be expected over the whole life-time. Yet it is questionable where young people have the ability and/or enough information to do so (Manski 1993).

Furthermore, the actors on labour markets are presumed to maximise their utility and to act under conditions of perfect competition, which means that no individual is able to influence price formation by changing his or her behaviour. This issue is taken up by power resource approaches that emphasise power differentials not only between employers and employees but also among different groups of employees. *Insider-outsider theory* is concerned with these dimensions by stating that job holders, as insiders, have a more powerful position than outsiders – such as unemployed persons or labour market entrants. As a result, they can draw on more resources when negotiating their wages and working conditions. This theory provides explanations for the effects of union density and employment protection, in a way that the higher the wage bargaining power of trade unions (representing labour market insiders) and/or the higher the degree of employment protection, the higher youth unemployment is expected to be (e.g. van der Velden and Wolbers 2003; Julkunen 2010). A number of studies have substantiated this assumption.

¹⁷ In its original version, human capital theory related educational level to income, but the same relation showed up with qualitative labour market characteristics, such as incidence of temporary employment, job security, and so on.

5. Methodological Innovations

5.1. Sequence Analysis

"The transition from initial education to working life is not a clearly defined concept in terms of policy, practice or research. However to the extent to which there is an agreed concept of transition it has become broader. It now covers a longer sequence of educational and labour-market statuses and a wider range of educational and labour-market processes."

(Raffe, Biggart et al. 1998: 8)

Sequence analysis was originally invented by biologists with the aim of comparing DNA sequences in order to find out the extent to which two DNA strands are homologous to each other, or, in other words, to determine the distance between them (Kruskal 1983). The established degree of similarity then allowed for drawing conclusions about a common ancestor of two DNA strands. The first sociologist to use sequence analysis, as early as the 1980s, was Andrew Abbott, in his works on musicians' careers and ritual dances (Abbott 1983; Abbott and Forrest 1986). Here, sequence analysis was seen as a more qualitative tool in the context of historical, narrative sociology. Due to the limited capacity of computers, analysis was restricted to only a few cases with short sequences. Since the 1990s, with increasing technological advancement, researchers have begun to focus on individual sequences, such as class careers (Halpin and Chan 1998), employment biographies (Abbott and Hrycak 1990; Blair-Loy 1999; Pollock, Antcliff et al. 2002), family histories (Elzinga and Liefbroer 2007), school-to-work-transitions (Scherer 2001; Schoon, McCulloch et al. 2001; McVicar and Anyadike-Danes 2002; Brzinsky-Fay 2007) and life-course trajectories (Billari and Piccarreta 2005; Wiggins, Erzberger et al. 2007; Martin, Schoon et al. 2008). The technical situation improved further with increasing processor speed and the wider availability of software implementations. Specifically, the various implementations of sequence analysis in the general statistical software package Stata by this author (see section 6.1) have enabled more researchers from different disciplines to compare sequences of a large number of individuals, finding out similarities, quantifying certain characteristics or grouping them into ideal types.¹⁸ The increasing number of applications also led to a more in-depth discussion about the potential and limitations of sequence analysis methods. In recent years, a noteworthy number of researchers have worked on enhancements

¹⁸ A platform-independent implementation of various tasks for sequence analysis including optimal matching is the Stata ado-package SQ (Brzinsky-Fay, Kohler et al. 2006). The most recent version of this package can be downloaded from within Stata with the command "ssc install sq". Stata Plugins for optimal matching and some other computationally intensive algorithms for sequence analysis are available from the website <http://teaching.sociology.ul.ie/seqanal/> maintained by Brendan Halpin.

and refinements of the method itself (Gauthier, Widmer et al. 2009; Hollister 2009; Studer, Ritschard et al. 2011), some of which are presented in a special issue of *Sociological Methods & Research* (Brzinsky-Fay and Kohler 2010), as well as a sizable and increasing number of sequence analysis applications within the social sciences (Huang, El-Khoury et al. 2007; Kogan 2007; Shoval and Isaacson 2007; Quintini and Manfredi 2009; Gauthier, Widmer et al. 2010; Salmela-Aro, Kiuru et al. 2011; Simonson, Romeu Gordo et al. 2011).

Sequences or categorical time-series are ordered listings of elements (MacIndoe and Abbott 2004; Brzinsky-Fay, Kohler et al. 2006), in which an element or time point can be a certain status (e.g. labour market or marital status) or a physical object (e.g. base pair of DNA, protein of enzyme) or an event (e.g. dance step or crime). These elements are tied to either fixed points of time (e.g. status in a certain month), or to fixed positions (e.g. protein at position 12). Sequences have in common that their specific order is of crucial importance and therefore cannot be changed. The main task of sequence analysis is comparing those sequences. The comparison of sequences often starts with visual inspection, for which so-called sequence index plots or specific forms of parallel coordinate plots (Brzinsky-Fay, Kohler et al. 2006) are the means most often used. Further comparison is done with simple descriptive indicators for specific characteristics of the whole sequence – such as the length of the sequence, the number of episode changes within a sequence, or the number of different elements in the sequence. More advanced measures for sequence similarity take into account more than one feature of a sequence. Elzinga (2003), for example, proposed measures for “turbulence” and the frequency of certain subsequences to qualify sequence characteristics. However, the most frequently used technique for comparing sequences is optimal matching (OM). OM defines the distance between two sequences as the number of operations it takes to transform one sequence into the other. More specifically, the technique allows the operations “substitution” (changing one element into another element), “insertion” (insert an element at a specific position), or “deletion” (delete an element at a specific position). The resulting distance measure is called – after its inventor – the “Levenshtein distance” (Levenshtein 1966), and the values are computationally achieved by the Needleman-Wunsch algorithm (Needleman and Wunsch 1970). After having established the similarity or dissimilarity between each pair of sequences, the resulting distance matrix can be used as input for a cluster analysis or multidimensional scaling, which is often thought of as the second step of sequence analysis.

The application of OM requires the definition of costs for the basic operations used to transform one sequence into the other. These costs have to be defined ex ante by the researcher. The supposed “subjectivity” or “arbitrariness” of this definition is one of the main objections against the potential of the method (Levine 2000; Wu 2000). In fact, in many cases there is no theoretical basis for choosing the numerical values of the costs attached to substitution, insertion, or deletion. However, in some cases the computation of these costs via transition frequencies might be a solution, while heuristic testing of automated cost calculation, as recently proposed by Gauthier et al. (2009), might be another. Because sequence analysis is explorative in nature, there is no “true” cost structure, but in order to find patterns in the data, different cost

structures need to be tested iteratively, while the requirements of validity and reliability must be considered (Bernard 2000). Another major drawback of OM was the one-dimensionality of the categories or elements that the sequences were composed of. The analysis of parallel or multiple sequences (e.g. employment career and family formation at the same time) has been a serious handicap of the method. Lately, however, there have been a couple of attempts to tackle this challenge, mainly in the field of life-course research (Aassve, Billari et al. 2007; Piccarreta and Billari 2007; Pollock 2007).

However, every researcher proposing a new method that they want to become accepted within the canonical methodological toolbox normally calls into question the potential of the established methods. But as soon as the method attracts a wider range of scholars because of its newness, it necessarily has to meet the challenge of proving its scientific power (cf. Levine 2000: 34). Regarding the examination to school-to-work transitions, the application of sequence analysis provides important potential – as Raffe (2009: 111) points out: “The recent quantitative work comparing transition sequences [...] represents an important line of development.”

5.2. Qualitative Comparative Analysis

In the 1990s, the so-called small-N-problem resulted in a relatively small number of studies investigating a medium number (3-20) of countries (Ragin, Berg-Schlosser et al. 1996), while the majority of studies either covered 1-4 countries – applying qualitative case studies – or more than 30 countries – applying (quantitative) statistical methods. Apart from the number of countries under investigation, there are some fundamental differences between the statistical method and case studies (Table 1): whereas the former method is based on a highly formalised (“objective”) mathematical toolbox, the latter requires the (“subjective”) definition of its measures and research strategies. Apart from that, statistical methods (mostly) follow an inductive approach – that is, they aim at testing hypotheses, whereas qualitative case studies (mostly) have a deductive approach: the objective is to develop hypotheses and theories. This comes along with a heuristic focus intended to understand objects and processes in order to investigate or detect causal relationships, whereas statistical methods are designed to make inferences – that is, to confirm or to reject causal relationships – and to establish generalisations that ought to be valid beyond the cases under observation. Last but not least, case studies have – as the label implies – a holistic focus; that is, they regard cases as a whole, whereas variable-oriented methods often only refer to single characteristics of the cases under observation.

Qualitative Comparative Analysis (QCA) is a kind of compromise between case studies and the statistical method. In its original form, nowadays called *crisp-set QCA* or *csQCA*, only dichotomous variables could be used for analysis, and conditions¹⁹

¹⁹ The QCA terminology is slightly different from that of statistical models. Independent variables are labelled “conditions”, and dependent variables are synonymous with “outcomes”.

were only distinguished by their presence or absence. The same was true of the outcome variable. Nowadays, we could also use interval-scaled variables by applying so-called fuzzy algebra. The characteristics of cases under investigation are no longer present or not – in set theory terminology: they do not belong to a certain set or not – but cases are assigned to the membership by a continuous scale between 0 and 1, where 0 means “perfect non-membership”, and 1 means “perfect membership”, and 0.5 is called the “point of indifference”.²⁰ Interval-scaled variables must be transformed into fuzzy scales, which should not be done automatically, but considering specific case knowledge. These fuzzy set scales constitute graduations, and the thresholds need to be defined by the researcher.²¹ The truth table for fuzzy sets arranges the empirical cases to their corresponding theoretical configurations by using the cases’ membership values for each condition. By using measures of consistency and coverage, the configurations and their minimised solution can be validated.

Table 1: Case Studies, QCA and the Statistical Method

Case studies	QCA	Statistical method
Low degree of formalisation	High degree of formalisation	High degree of formalisation
Induction: developing theories and hypotheses	Induction and deduction	Deduction: testing of hypotheses
Heuristic: understanding	Understanding and modest generalisation (relative)	Inference: generalisation (absolute)
Holistic: case-oriented	Case- and variable-oriented	variable-oriented

Source: Ragin (1987; 2000), Ragin/Rihoux (2009); own arrangement

The application of classical regression models in order to disentangle institutional effects on individual outcomes suffers from the existence of different levels of

²⁰ For more extensive information on the technique of fsQCA, see (Rihoux and Ragin 2009) or (Schneider and Wagemann 2007).

²¹ In order to assure transparency and allow for traceability, the transformations from interval-scaled variables into fuzzy set scales should be reported (Schneider and Wagemann 2010). A transformation table can be found in the appendix.

analysis when connecting macro-level conditions with micro-level outcomes. When countries are simply compared at the aggregate level, the small-N problem occurs as mentioned above. In the first case, the institutional variables do not have enough variance because they are constant at the national level, thus violating a basic assumption of statistical analysis. In the second case, the dilemma of "many variables, few cases" (Lijphart 1975), by lowering the degree of freedom, directs regression models into a dead-end street.²² Models become over-determined and, as a result, obtained coefficients are not robust (Goldthorpe 2000: 49). Furthermore, regression models are based on the conception of additive causation, where each additional independent variable increases the explained variation of the dependent variable. But in complex societies, causation should also assumed to be complex or multiple, and hence, while different combinations of different causal factors can have the same effect (King, Keohane et al. 1994), regression models are hardly able to capture these mechanisms. Or, as Paul Pierson has put it: "'Variables' may have a particular impact only when accompanied by a set of additional factors" (2001: 428), or elsewhere: "Different welfare state configurations are the products of complex conjunctural causation, with multiple factors working together over extended periods of time to generate dramatically different outcomes." (Pierson 2001: 429)

Combined effects – or functional equivalents – of certain institutions do not appear in such models. In a recent OECD study, for example, no robust effects of wage-setting institutions on wages and employment were found, while the authors mentioned not having considered "interaction effects between the organisation of wage bargaining and other policies (e.g. employment protection)" (OECD 2004a: 130). However, to include interaction effects in regression models means to increase the number of independent variables; as a result, significances of the estimates become smaller. This is especially true if one aims at testing for interactions for all independent variables. Apart from that, the additive causality of regression is still present. Using QCA, researchers become able to analyse relationships between an outcome and all possible combinations of multiple predictors rather than only calculating net effects of single variables.

A further advantage of fuzzy-set QCA is its closeness to theory, as mentioned by Kvist (2007: 205). He argues that mathematical, metric-scaled indicators often don't have the potential to match theoretical, verbal statements about reality. Using fuzzy-set theory means to adjust the method to verbal theoretical axioms, because the definition of fuzzy values follows the verbal logic more than it does the mathematical, linear measurement of characteristics – in other words, mathematical precision is misleading if theoretical concepts are qualitative in nature. However, it has to be considered that not every theoretical approach is verbal or qualitative by

²² Referring to the analysis of institutional effects on school-to-work transitions, Raffe concludes that there are more institutional dimensions (independent variables) than countries in most of the comparative studies, and that "this makes it hard to test the relative importance of different dimensions through comparative analysis: 'degrees of freedom' are quickly exhausted." (Raffe 2009: 109)

definition. Qualitative and quantitative theoretical ways are both legitimate approaches to capture and systemise social relations in the real world. Therefore, Kvist's proposed closeness of fuzzy-sets to theory does not necessarily apply in every case.

Regarding all the issues briefly mentioned here, there is a lot of discussion going on concerning QCA and its merits for methodological development in the social sciences (Ragin 1987; King, Keohane et al. 1994; Goldthorpe 2000; Brady and Collier 2004; Shalev 2007). The debate is fierce not only because of the provocative and polarised way in which each side puts forth its arguments but also because a number of fundamental issues are at stake. On the one hand, the classic statistical method – regression analysis – is so well established and sophisticated that its weaknesses seem to disappear in the eyes of its users. On the other hand, to establish a new kind of method means facing insurmountable thresholds within the scientific community. However, QCA aims at tackling some of the problems of regression analysis, while having certain limitations itself – just like any other method.

6. Structure of the Doctoral Thesis

This doctoral thesis contains five articles, four of which have already been published, while one is still under review (Autumn 2011). Of the published articles, two appeared in SSCI-journals, one was published as a chapter in an edited book (for which it had to undergo double-blind review), and one was published as a discussion paper at the Social Science Research Center Berlin (WZB). The remaining article under review has been submitted to a SSCI-journal.

6.1. Sequence Analysis Using Stata

The first article (Brzinsky-Fay, Kohler et al. 2006) describes the methodological tool that was used in the second and the third article (see sections 6.2 and 6.3), namely sequence analysis. We developed a programme bundle for the standard software package Stata, which can be installed easily and added to the other statistical commands. Despite the fact that a few software applications²³ designed to enable researchers to conduct sequence analyses existed already, this was a necessary and path-breaking work for two main reasons:

- 1) Although the other software applications are powerful instruments, they are also stand-alone programmes in their own right, meaning that researchers face high thresholds when using this method, having to learn not only a new method, its logic and mathematics, but also the new software, including its language and syntax. Because this is a very time-consuming task, the method is not very likely to be applied. Implementing the sequence analysis ado-files into the widely used Stata software, in contrast, means enabling many more researchers to analyse sequential data and, therefore, to contribute to further developments in this field.
- 2) Some of the available software was not updated anymore, or at least not updated regularly. For example, the most recent version of OPTIMIZE dated from 1997, and the last substantial revision of the sequence commands in TDA was made in 2005. This means that several new developments of the method were not implemented in the statistics software.²⁴ Because of the open structure of Stata, which allows everyone to write and enhance ado-files that

²³ The first programme for conducting sequence analysis was OPTIMIZE, written by Prof. Andrew Abbott (<http://home.uchicago.edu/~aabbott/om.html>). Apart from that, Götz Rohwer and Ulrich Pötter wrote TDA (<http://www.stat.ruhr-uni-bochum.de/tda.html>), a statistics software package distributed as freeware under the terms of the GNU General Public Licence (GPL). On the one hand, this is a very powerful tool for analysing longitudinal data; on the other hand, it is quite difficult to apply, and its syntax is very demanding for users to learn. The same is true for the module TRAMINER, which was developed Alexis Gabadinho, Matthias Studer, Nicolas S. Müller and Gilbert Ritschard (<http://mephisto.unige.ch/traminer/index.shtml>) for the statistical software package R.

²⁴ For the latest developments in sequence analysis, see Brzinsky-Fay and Kohler(2010).

can easily be implemented, the software can be updated on a regular basis, even by other researchers.

The program bundle for sequence analysis comprises Stata commands for all of the necessary operations, (i.e. description, visualisation, comparison and grouping of sequential data), whereas the grouping is done by classification methods (e.g. cluster analysis or multidimensional scaling). The description is a basic task of counting elements of a certain type, episodes, episodes length. This information can be correlated to other variables relevant to the research question. Even though visualisation constitutes a very important part of sequence analysis, it is neglected by other software packages. Because of the high complexity of sequence data and the exploratory objective of the method, repeated visual inspection allows for detecting structure or meaningful commonalities or differences within the data. Sequence data can be visualised either by sequence index plots (Kohler and Brzinsky-Fay 2005) or by parallel coordinate plots. While the former displays every single sequence in a diagram, the latter performs an aggregation by summarizing sequences according to their characteristic and frequency. The comparison of the sequences delivers a measure of similarity that again can be used by classification methods to group similar sequences into ideal types.

As mentioned before, sequence analysis is an exploratory rather than a hypothesis-testing method. Given the increasing amount of longitudinal data researchers have at their disposal, computational tools that aim at reducing complexity in a meaningful manner have increasingly gained importance. In this sense, sequence analysis is a powerful tool that allows for detecting structure in a seemingly chaotic mass of information. Compared to the methods usually applied to longitudinal data – such as event history analysis – it has a holistic view, because sequences are treated as entities. Regarding labour market transitions, sequence analysis enables researchers to go beyond simplified definitions of what a transition is, where it starts, or where it ends (see section 2.4). However, it has to be applied cautiously and unfolds its full power only within a meaningful research design, at best when combined with other (causal) methods. This is done in the second article of my dissertation, which is outlined in the subsequent section, as well as in the third article, which is summarised in section 6.3.

6.2. Lost in Transition: Labour Market Entry Sequences of School Leavers in Europe

The second article (Brzinsky-Fay 2007) refers to the research gap described in section 2.4, namely the longitudinal analysis of transition processes. Based on the observation that despite the existence of comprehensive longitudinal data, the research on school-to-work transition processes still remains at the level of analysing single status changes, the article adopts a holistic perspective by applying the relatively new method of sequence analysis to longitudinal information on monthly labour market statuses within five years after leaving compulsory school. The data

are taken from the European Household Panel (EHP), include ten European countries²⁵, and cover a period ranging from 1993 to 2000. By using a preliminary theoretical work from Sackmann and Wingens (2003), certain ideal types of transition sequences are identified, and their distribution across countries is compared with existing country typologies, namely the ILM-OLM dichotomy of Marsden (Marsden 1990; Marsden 1999) and the country classification of Gangl (2003). Additionally, two indicators – volatility and integrative potential – are developed that aim to measure important characteristics of school-to-work transitions.

There are eight distinct transition types detected on the employment calendar data, and their proportion varies considerably across countries:

- 1) Link: In this transition type, education episodes are concentrated at the beginning of the 60-month period, while at the end, most of the transitions lead to employment.
- 2) Return: School leavers that show this transition sequence go back to full-time education after a very short period of employment, inactivity or unemployment. Since the education period is not finished at the end of the observation window in most cases, this type is labelled “return” – according to Sackmann and Wingens’s theoretically derived typology.
- 3) Failure: This transition type is mainly composed of unemployment, which means that school leavers are indeed interested in labour market participation, but fail to get a job.
- 4) Detour: After a considerable period of unemployment, these school leavers eventually find employment. This kind of unemployment can most probably be described as search unemployment, maybe accompanied by retraining or geographical mobility (both of which cannot be examined in the data).
- 5) Dropout: Unlike the failure type, the dropout transition type comprises mainly long-lasting inactivity. These school leavers are no longer in the labour force for a variety of reasons, such as military service or child care activities.
- 6) Bridge: This transition type is mainly built on apprenticeship periods, which constitute a bridge between school education and labour market.
- 7) Break: In contrast to the dropout transitions, inactivity periods in the break type are quite short and mostly lead to employment.
- 8) Express: The transition pathways with the fastest integration into employment are summarised in the express type. However, one should keep in mind that

²⁵ The EHP comprises longitudinal information on 15 Western European countries, out of which the data for Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Portugal, Spain and the United Kingdom are used.

there is no information about the quality of the jobs that these school leavers start with.

Although the explorative analysis is valuable in and of itself, it is not sufficient, because any typology should somehow demonstrate that it is meaningful. This can be achieved either by comparing it to other typologies created from different information, or by performing hypothesis-testing analyses. The former approach was chosen in this article; the latter was realized in the fourth article (section 6.3). In order to test the construct validity (Bernard 2000: 50) of the typology found, the following hypotheses are tested in this article:

- 1) Despite a high degree of cross-national variation, all types of transition sequences appear in each country. This hypothesis is confirmed and shows the large variation of school-to-work transitions within the countries.
- 2) Countries with ILM systems will show more changes between labour market statuses than countries with OLM systems. This hypothesis is only weakly confirmed and points to the weak explanatory power of the ILM-OLM theory for school-to-work transitions. On the other hand, Gangl's classification can be perfectly observed in the data. This raises the suspicion that educational institutions, which Gangl takes as a distinctive characteristic, are more important in shaping the school-to-work transition than labour market institutions, which play the major role in Marsden's ILM-OLM theory.
- 3) Countries with extensive vocational training systems will have more positive volatility than countries without these systems. Because the highest values for volatility are found in Germany, Denmark and Ireland – that is, countries possessing either extensive vocational and/or established further training systems – this hypothesis is also confirmed.
- 4) High integrative capability exists in countries where the coordination process between the educational system and the labour market is either structured (extensive vocational training systems) or where it emphasizes the temporal dimension of labour market integration (general qualifications). This hypothesis is only partly confirmed, because the values for integrative potential are high only in the United Kingdom, France, Belgium and Ireland – the countries in which the temporal dimension of labour market integration is emphasised.

The application of sequence analysis to the school-to-work transitions has proved to deliver valuable insights into the structure of pathways from school into the labour market. In this article, however, it is used in an exploratory manner, while the analysis remains at the micro-level. The following steps should broaden this view by combining sequence analysis with a hypothesis-testing method, and by including the macro-level to identify institutional effects. The former was done in the article "Get the Balance Right" (section 6.3); the latter was the main objective in the article "Institutions and School-to-Work Transitions", which is summarised in section 6.4.

6.3. Get the Balance Right: Risk and Flexibility in School-to-Work Transition Sequences

This article (Brzinsky-Fay 2008) is an extension of the second article (section 6.2) by the estimation of individual socio-economic effects on the probability to enter the labour market after leaving school via a certain transition type. The objective of the edited book, in which this article is published, is to analyse the degree of flexibility and security within different labour market transitions against the background of the concept of Transitional Labour Markets (see sections 6.5). The basic idea is to estimate a multinomial logit model, in which the individual variables gender, migration background, and educational level as well as country dummies are taken as independent variables, while the school-to-work transition types explored in the first article serve as dependent variables. The coefficients in this equation will show the individual effects on the labour market entry controlled for country characteristics. The results should also provide answers to some of the questions, for which in the second article and its explorative notion only assumptions could be made. The model reveals a couple of interesting results (for better understanding, the model estimates can be found in Appendix A2):

- 1) Most predictor variables have significant effects, but the overall goodness of fit – measured by the Pseudo-R² – is quite low (24%), which means that apart from the variables used in this model, there must be other unobserved factors influencing the transition pathway from school to work.
- 2) The coefficients for the countries, in most cases, are higher than those of the individual characteristics. That means that institutional factors – and countries are configurations of institutions – are more important for the shape of school-to-work transition pathways than socio-economic factors. This is particularly valid for the link and the return transition types, both of which are mainly related to education.
- 3) Women are six times more likely to be represented in the dropout transition type than men (holding the other factors constant), but 1.3 times less likely in the break pathway. This can be interpreted as a higher risk for female school leavers to stay inactive for a longer period after initially entering inactivity (e.g. because of childcare).
- 4) Migrants face a 3.5 times higher risk of being excluded from the labour market via a dropout transition than the native population, while at the same time, they have a 2.2 times lower chance to enter the labour market via the bridge type. This suggests that apprenticeship systems have problems integrating migrant youth.
- 5) According to human capital theory, education has an expected effect on outcomes: the higher a person's educational level upon graduation, the higher their chance to enter the labour market in a favourable way. School leavers with a high educational level have a 22.6 times lower risk of entering the dropout pathway than those with low levels of education. The chances of

passing through the link or return transition type, both of which serve to increase educational attainment, are also clearly higher for school leavers who start out at a higher educational level. Education, therefore, is a cumulative property. A remarkable exception from this rule is the probability of entering the labour market via the bridge transition, where higher educated school leavers have lower chances than those with a medium level of education. This points to the fact that apprenticeships are designed for people with a medium level of education

- 6) The return transition type seems to be very typical of Denmark, because the coefficients for all of the other countries are negative, and Denmark is the reference category. Most probably, this is an effect of its well-established further education system and the low barriers between different parts of the further and higher education system.
- 7) The typical transition type for Italy and Spain is the failure type. In fact, these two countries are the only ones to have positive coefficients in this category, which means that Italian and Spanish school leavers have a higher risk of going through a transition mainly composed of unemployment. Italy is the only country that also shows a higher risk of being excluded from the labour market (dropout type). The Mediterranean countries are characterised by the absence of institutional regulations and policies concerned with the transition from school to work.
- 8) Transitions of the break and detour type seem to be unspecific regarding the country effects, because their coefficients are quite homogeneously distributed across the countries.
- 9) The bridge transition type, which involves apprenticeship training, is very typical of Germany and – to a lower extent – of Denmark. The chance to enter the labour market via this type in these countries is twice as high compared to the express type (reference category).

The research design applied in this article is an example of how to combine innovative explorative methods with classic hypothesis-testing regression models. Explorative methods are able to extract valuable information from the data and structure them, whereas regression models are used to draw causal inferences. The results show the expected effects for the socio-economic variables, whereas the country effects reveal some new insights into how institutional configurations influence transition pathways from school to work. Since countries can be seen as a combination of different institutions – in other words: configurations – it is desirable to disentangle them and analyse their effects at the micro-level. This is done within the fourth article of my doctoral thesis, which is summarised in the following section.

6.4. Institutions and School-to-Work Transitions: Conjunctural Effects on Labour Market Integration of School Leavers

With this paper (Brzinsky-Fay, under review), I try to fill two major gaps in school-to-work transition research: first, by analysing the conjunctural or complex effects of institutional settings on the transition between school and labour market, and second, by considering institutional characteristics as configurations. The basic idea is that institutions unfold their effects only in connection with other institutions and that these effects might vary in both magnitude and direction when the combination of specific institutions is changed. Even though the path-breaking institutional approaches of the past two decades – first and foremost, Esping-Andersen's *Three Worlds of Welfare Capitalism* (1990) and Hall and Soskice's *Varieties of Capitalism* (2001b) – assume institutions to function in complementary ways and, therefore, to constitute regimes, most researchers continue to use a purely variable-oriented rather than a configurational approach when analysing institutional effects (see section 2.3).

In the paper, I apply QCA (see section 5.2) to analyse the effects of aggregate measures of institutional characteristics (conditions) on indicators describing the youth labour market (outcomes) in 30 OECD countries. The institutional measures comprise characteristics of the education system and the labour market. QCA provides the possibility to select relevant conditions, to qualify conditions as necessary and/or sufficient, and to analyse conjunctural effects of combinations of conditions. The institutional conditions of the labour market are employment protection (measured by the EPL-index developed by the OECD) and wage-setting institutions (measured by trade union density). Institutions in the education system include vocational specificity (measured by the share of students following vocationally oriented tracks, either at school or in dual systems), stratification (measured by the number of school tracks available to 15-year-olds, the age of selection in these school tracks, and the interdecile range of reading competencies within a country), and standardisation (measured by an indicator composed of government influence, school autonomy, accountability and the existence of national examinations). Additionally, other influencing conditions were tested, including the net replacement rate and the country's economic globalisation. The outcome variables are the relative youth unemployment rate, which reflects the relative disadvantage of school leavers in comparison with prime-age workers, and the so-called NEET-rate, which reflects the share of young people neither in employment nor in education or training.

The institutional conditions that show effects on relative youth unemployment are employment protection, vocational specificity, standardisation and stratification (or combinations of these conditions). Neither net replacement rates, nor wage-setting institutions significantly influence the level of relative youth unemployment. No single institution is a sufficient condition on its own, which is a clear indication not to analyse institutional effects in isolation from other institutions, as is usually the case in regression models without extensive interaction effects. Thus, a low relative youth unemployment rate is the result of the co-actions of two or more institutions. Similarly, no single institution could be identified as a necessary condition for the

relative youth unemployment rate. That means that completely different institutional configurations may lead to a similar outcome. Across all of the tested models, the most stable combination of institutions producing an effect is high employment protection in combination with low vocational specificity. That means that the relative youth unemployment rate is high in countries characterised by high employment protection and low vocational specificity at the same time. High employment protection alone is not enough to lower youth unemployment; it has to come along with low vocational specificity. Similarly, low vocational specificity on its own is not sufficient for explaining high relative youth unemployment; only if it is combined with high unemployment protection does the effect become visible.

The institutional conditions that have an effect on the NEET rate also include employment protection, vocational specificity, stratification and standardisation, but in configurations very different from those that produce the outcome high relative youth unemployment. A low level of standardisation seems to have an increasing effect on the NEET rate, thus constituting a sufficient condition. A high level of stratification, in combination with either low employment protection or low vocational specificity, also increases the NEET rate.

The results of the QCA are more complex than those of regression models, where each independent variable can be interpreted *ceteris paribus*. Theories derived from and employed by regression models follow the same logic, referring to one characteristic and its net effects on certain outcomes. However, the analysis shows that the effects are complex; hence theories need to be reformulated. In that sense, the application of QCA is the first step towards a research field of complex theory building.

6.5. The Concept of Transitional Labour Markets: A Theoretical and Methodological Inventory

The final article (Brzinsky-Fay 2010) refers to one of the theoretical foundations of school-to-work transitions research, simply proposing a comprehensive stock-taking of the broad-range concept of Transitional Labour Markets (TLM). This research review regarding the concept's methodological and theoretical achievements looks at the outcomes (i.e. all publications) of the two large-scale European research projects based on this approach, comparing them with respect to a number of characteristics such as applied methodology, theoretical development, comparative design, number of countries covered, and the like. The changes observed between the publications of the two projects are distilled into recommendations for the future development of the TLM concept, which – compared to conventional transition or labour market research – stands out for four reasons:

- 1) The crucial added value of the TLM concept is its comprehensive view of the labour market, a view that involves the individual as well as the institutional and policy levels. Labour market research is quite segmented between the various disciplines and approaches, each of which has a different scope and applies different methods. Micro-economic approaches are focussed on the individual level and usually prefer a complex quantitative methodology,

whereas researchers in the field of political economy place an emphasis on the institutional level. Policies are either analysed regarding their effects within micro-economic evaluation designs, or regarding their formation by policy analysts, who employ qualitative methods. The TLM concept is the only attempt to bring these approaches together (cf. Schmid, O'Reilly et al. 1996).

- 2) The TLM concept combines normative aspects of how labour markets should work with empirical analyses of their as-is state in order to develop policy recommendations. The normative dimension is very much based on theories of justice (Rawls 1990; Dworkin 2000), and serves as a projection screen for assessments of policies and institutions. Connecting normative and empirical dimensions of labour market research is what makes the TLM concept unique.
- 3) Another distinctive feature of the TLM concept is its comparative focus. Of course, conducting comparative research per se does not seem to be special, but the TLM concept addresses a crucial gap in the whole field of labour market research: comparing regime effects with respect to the functional equivalents of different combinations of institutions and policies.
- 4) Finally, the fact that the TLM concept aims to be a concept rather than a theory makes it open for theoretical and methodological influences of different origins.

The concept's openness and broad scope are an ongoing challenge in terms of keeping the appropriate degree of elasticity, which requires some synchronicity between theoretical and methodological development. This is the main concern of my research review: the increase of theoretical development at the expense of methodological development. To overcome this imbalance, I make some suggestions about future methodological applications:

- 1) The basic analytical unit – the transition – needs to be theoretically defined in a more precise manner concerning the distinction of status change, transition, and trajectory. Empirically, transitions must be analysed in more detail in both explorative and inferential ways.
- 2) I suggest that the transition typology be generalised and extended beyond the generally used one having been developed by O'Reilly, Cebrián et al. (2000) – integrative, maintenance and exclusionary transitions.
- 3) The comparative dimension of evaluation methodology remains another promising field of future activity within the TLM concept. This dimension particularly emphasises the further development of a systematic comparative analytical framework for evaluation tools, which has already been started by Schmid et al. (1997).
- 4) Being able to bridge the micro-macro-gap by applying multilevel models is one further benefit of analysing employment regimes. Even if this kind of modelling is not really new, it has hardly been applied to the analysis of relations between institutions and micro-level processes.

- 5) Finally, the emergence of Qualitative Comparative Analysis (QCA) provides a good opportunity to strengthen the holistic analysis of employment regimes, because applying this method enables researchers to examine complex (or conjunctural) causalities inherent to institutional configurations and their effects on individual employment behaviour.

7. Country Profiles

This section is designed to describe, in analytical terms, the institutional frameworks of the countries observed from the early 1990s until the 2000s. Its main purpose is to provide a rationale for the definition of the fuzzy scores (see Appendix A3) that were used in the fourth article, “Institutions and School-to-Work Transitions: Conjunctural Effects on Labour Market Integration of School Leavers” (see section 6.4). In this dissertation, the institutional configurations of the countries do not serve as the starting point but more as a data source for answering the research questions mentioned in the sections above. Having comprehensive knowledge of the cases under study is an important precondition for comparative analysis generally, and for QCA in particular (cf. Schneider and Wagemann 2010). Since analysing 30 OECD countries clearly is far beyond the scope of a classic case-study design, one runs the risk of not coding countries’ institutional configurations properly. Moreover, the fact that the common coding scheme does include Eastern European countries²⁶, which were previously examined in single-case studies only (Saar, Unt et al. 2008: 32), makes it an important contribution to the comparative analysis of institutional effects on school-to-work transitions.

For lack of space, it is not possible to assess the complexity of each country’s educational and employment system in its entirety in this introduction.²⁷ Thus only eight examples are presented to illustrate the kind of country study from which the specific information regarding institutions and outcomes were derived.²⁸ A number of case studies illustrating the institutional peculiarities of transition systems already exist. But the pool of comparative studies that include more than three countries is not very large. Even studies that comprise many countries – for example Shavit and Müller (1998) – to a large extent, are of the “juxtaposed case study” kind. Under certain conditions, this may have serious consequences regarding the assignment of countries according to classifications. For instance, the United Kingdom can be classified as an OLM or as an ILM country, depending on the countries it is compared with.²⁹ Therefore, the country profiles provided here are targeted and

²⁶ The inclusion of the East European countries in comparative analyses challenges both theories and empirical findings regarding institutional effects on school-to-work transitions in many ways. For instance, we now find countries that have educational systems which track students into general and vocational education careers, but at the same time feature only weak links between education and the labour market (cf. Saar, Unt et al. 2008: 35).

²⁷ Interested readers may be referred to the database constructed for his purposes. On a country-year basis, it contains variables on labour market and educational institutions as well as variables to describe aggregated outcomes of school-to-work transition regimes. Please contact the author for further details.

²⁸ The author conducted country studies of all the 30 OECD countries that create the base for the institutional analyses.

²⁹ For further details, see Eyraud/Marsden et al. (1990) and Brauns/Gangl et al. (1999). Another discussion about the United Kingdom and its classification within the ILM-OLM-dichotomy took

comparative in nature. They assemble information from the major comparative studies and case studies in the field of school-to-work transitions, but distil this information according to crucial common institutional variables in order to provide a “variable grid” necessary for genuine comparative analysis.

7.1. Australia

The institutional framework for school-to-work transitions in Australia is strongly influenced by its British heritage, which is responsible for a small-sized initial vocational preparation system and a tradition of considering vocational training and education as two activities separate from each other (Sweet 1999; Bagnall 2000). Institutionally, this leads to a split between vocational and non-vocational qualification streams. In contrast to its former colonial power, Australia has a federal system of government, in which the federal government has the revenue-raising power, whereas state and territorial governments are responsible for the legislative arrangements and expenditures for primary and secondary education and vocational training (Jones 1998). Tertiary education, however, is supervised by the federal government. The relative independence of the states “continues to cause difficulties for the harmonisation of national education and training arrangements” (Sweet 1999: 70) by simultaneously leading to complexity and a low degree of standardisation within the education system. For instance, in addition to a school-based vocational training system – the so-called TAFE (Technical and Further Training) system – there are several employment-based contractual training schemes: the Australian Traineeship System (ATS), introduced in 1985, the Australian Vocational Certificate Training System (AVCTS), and the Career Start Traineeship (CST), both launched in 1992. Sweet (1999: 118) consequently comes to the conclusion that “certification arrangements in all elements of Australia’s school-to-work transition system are fragmented, frequently failing to support coherent pathways to work and further training.” Even if the Australian vocational training system is not standardised, it provides a number of vocational courses that, although not very specific, assure a medium degree of vocational specificity (Müller and Shavit 1998: 12). This complex and unstructured system of secondary vocational training exists alongside a school system characterised by low levels of stratification and standardisation: students are not sorted until the age of 16, 15-year-olds only have one school track at their disposal (OECD 2005), and national curricula or exams do not exist (Bagnall 2000).

The Australian labour market also builds on its British origins, because it is assigned to the liberal model of labour markets. The situation for school leavers is characterised by low entry wages, by a relatively high proportion of casual and part-time contracts for young workers, by low levels of employment protection for established employees, and by a decentralised wage-bargaining structure (OECD 2009a). These characteristics of the Australian labour market are seen as “likely to

place in 1990/1991 in the British Journal of Industrial Relations (Marsden and Ryan 1990; Chapman 1991; Marsden and Ryan 1991; Sako 1991).

have increased the labour market competitiveness of low-skilled youth”, while “relatively lax employment protection legislation (EPL) and the possibility of employing young people on a part-time basis or on casual contracts encourage risk-averse employers to recruit inexperienced and individuals with limited education” (OECD 2009a: 20-21).

Empirically, Australians are relatively young when leaving school, but at the same time, their aspiration for higher education and tertiary attainment is high (OECD 2009a: 55). Young Australian labour market entrants face high upward wage mobility and low youth unemployment rates. Fixed-term and part-time employment tend to serve as stepping stones rather than traps or stumbling blocks, which is to some extent a result of 17 years of uninterrupted economic growth (OECD 2009a).

To sum up the Australian case, we find an education system characterised by a low degree of standardisation, a relatively low degree of stratification, and a medium degree of vocational specificity. The labour market is very close to what is called a liberal labour market with little employment protection, a decentralised wage-bargaining structure, high wage mobility and a high proportion of casual employment contracts. The figures on youth unemployment are very close to the OECD average.

7.2. Denmark

In Denmark, the transition from school to work is strongly affected by the strong dual component of the vocational training system and a well-developed system of active labour market policies that mainly focus on further training (OECD 2010a). Schools and municipalities have a relatively high degree of autonomy, and employers and trade unions are involved in controlling workplace training and examinations within VET (Østerlund 1999: 159). Despite the low degree of government influence on schools and the high degree of school autonomy, examinations are highly standardised regarding both general and vocational credentials.

The Danish education system shows considerable vocational orientation even though this is not as pronounced as in Germany, where a higher share of school leavers pass through the dual system of apprenticeship training. However, a strong emphasis on career-relevant education is the rule even in primary and lower secondary school (*Folkeskole*) (Østerlund 1999: 157). About 50 per cent of Danish students undertake vocational education, making Denmark a country with a medium degree of vocational specificity.³⁰

The degree of stratification in the Danish education system is fairly low. Primary and lower secondary education (*Folkeskole*) is common, and students are not tracked into

³⁰ This is true for both definitions of vocational specificity: the share of students in vocational tracks as a share of all students, and the number of different occupations available for apprenticeship.

different curricula until the age of 16. Even the measure for the outcome dimension – namely the interdecile range of mathematics and reading competencies, which is used to measure the stratification of education systems – is relatively low. At the same time, there is little distinction between vocational and tertiary tracks: many tertiary studies, for example, require students to complete a compulsory work placement (OECD 2010a: 12). Thus, the permeability between vocational and tertiary education is high (Østerlund 1999: 166).

The Danish labour market (together with the Dutch labour market) is best characterised by what is called the flexicurity paradigm (cf. Bredgaard, Larsen et al. 2006; Bredgaard, Larsen et al. 2009; Viebrock and Clasen 2009), which aims at combining labour market flexibility and security for employees – two objectives that have always been seen as hard to reconcile by neo-classical economists. Translated into policies or institutions, this means the combination of generous social benefits and low labour market regulation or low employment protection, respectively. Since the mid-1990s, the EPL-index of Denmark shows the third lowest value among European countries; only Ireland and the United Kingdom have a lower degree of employment protection. At the same time, the net replacement rate in the initial phase of unemployment is among the highest in the world. The wage-setting institutions are quite established in Denmark: the bargaining coverage rate is between 70 and 80 per cent, and union density is around 70 per cent. Additionally, in Denmark one finds a strong tradition of adult education, which is well integrated with youth education (Østerlund 1999).

According to Breen (2005: 126), Denmark approximates the case of low labour market regulation and high qualification signalling, which both are seen as favourable for young labour market entrants. As a result, the situation for school leavers is quite positive regarding both low unemployment rates and high employment rates. The youth unemployment rate is below the OECD average, while the proportion of youth in employment is markedly above that in other OECD countries (OECD 2010a). Additionally, the incidence of education in Denmark is not concentrated on the initial phase after leaving school, but distributed across the life course.

7.3. Finland

School-to-work transitions in Finland within the last decades were affected by two major trends, one of which is the deep economic crisis in the 1990s (cf. Honkapohja and Koskela 1999). The other is Finland's remarkable performance in the OECD's "Programmes of International Student Assessment" (PISA), which were conducted in the years after 2000 (OECD 2001; OECD 2004b; OECD 2007). During the crisis, unemployment rates reached 20 per cent on average across the country. Young people in particular were hit hardest, as shown in the evolution of the Finnish relative youth unemployment rate (Appendix A4). However, the fact that Finland was managed to overcome this crisis to some extent can be attributed to appropriate education and economic policy responses based on the national consensus on the principle of equity (Aho, Pitkänen et al. 2006).

Regarding population size, Finland is a small country without federal structures. On the one hand, the government is involved in the definition of school curricula; on the other hand, school autonomy increased in the early 1990s (Järvinen and Vanttaja 2001: 196). The National Board of General Education only decides on key matters concerning curricula and evaluation, while other issues are decided by the municipalities (Aho, Pitkänen et al. 2006: 10). Standardised examinations in the Finnish education system only take place at the end of upper secondary education, in university admissions tests. The Finnish case highlights the difficulties involved in the concept of standardisation, which is composed of (partly contradictory) indicators that add up to an average value while disguising crucial characteristics. Since standardisation covers school autonomy as well as the existence of national examinations, the standardisation of the Finnish education system is on a lower to medium level.³¹

Stratification in the education system in Finland is virtually non-existent because there is a common compulsory comprehensive school where all students are taught together until the age of 16. After that, it is possible to continue for another three years on a general academic track or on a vocational track. Both of them, after completion, offer the possibility to study at an university (Tuovinen 2010: 596), an arrangement that also reduces stratification within the education system. At the secondary level, there is no tracking according to vocational or general education or according to students' ability (Aho, Pitkänen et al. 2006: 9).

Traditionally, vocational education in Finland has been regarded as having a lower social status than general education. Since the 1980s, educational reforms in Finland have aimed at increasing the competitiveness of vocational education in relation to general education. Even if this gap was not narrowed sustainably (Aho, Pitkänen et al. 2006: 9), the reforms successfully integrated vocational education into school curricula and introduced the possibility of university study for those who opt for the vocational track after comprehensive school (Tuovinen 2010: 569). Vocational education in Finland takes place mostly within schools, but apprenticeships exist as well. Only a little more than 10 per cent of vocational students are enrolled in apprenticeships (CEDEFOP 2006: 26). The vocational specificity of the education system, therefore, is on a medium level.

The Finnish labour market has gone through a fundamental change since the beginning of the 1990s. First and foremost, it was the collapse of the Soviet Union that caused the economic depression, as shown in the evolution of unemployment in Finland. Relative youth unemployment started decreasing in the early 1990s from nearly 5 (i.e. unemployment among 15-24-year-olds is five times higher than unemployment among 24-plus-year-olds) to a level of 2, from which it has slowly been increasing again since 2000 to a level of approximately 3. The level of

³¹ Sahlberg (2007: 155) claims that standardisation in Finland is low, but he only takes into account the relative autonomy of schools and the flexible accountability structures in the Finnish school system.

employment protection legislation is around the OECD average (Räsänen and Schmid 2008: 21), whereas trade union density and bargaining coverage is quite high, as in all Nordic countries. In the late 1990s, Finland implemented labour market policy reforms focussed on activating the workforce and preventing labour market exclusion (cf. Arnkil and Spangar 2001). With its notion of expanding employment and focussing on education, Finland – together with Denmark and the Netherlands – complies very much with the ideals of the Transitional Labour Markets approach (see section 6.5).

7.4. France

Since the 1980s, the structure of the French education system has been characterised by a policy of decentralisation, according to which responsibilities are increasingly transferred from the central government to the 22 regions and the 96 départements (cf. Sellier 2010). While primary schooling (*écoles élémentaire*) is in the hands of the municipalities, lower secondary education (*collèges*) is the prerogative of the departments, and the regions are in charge of upper secondary education (*lycées*). Despite this ongoing process of devolution, the central government has retained important rights regarding the definition of diplomas and degrees, or the recruitment and remuneration of staff (Bagnall 2000; CEDEFOP 2008). Therefore, the standardisation of the French education system still remains at a rather high level.

Regarding vocational specificity, France presents a somewhat ambiguous picture. Traditionally, France has been seen as a classical ILM country (Eyraud, Marsden et al. 1990: 504-5; Brauns, Gangl et al. 1999), where enterprise-specific vocational skills were provided within the firm, whereas basic vocational training was provided in vocational schools. Since France does not have a tradition of apprenticeship training, the “achievement of vocational qualification is highly related to (non-)achievement in the general school system” (Brauns, Gangl et al. 1999: 5). Moreover, the vocational qualifications provided are “not considered positive selection criteria, since [they are] mainly acquired by those pupils who failed in the general education system” (Brauns, Steinmann et al. 1999: 63). This perception is also valid for vocational schools, which “are simply a way of providing education for low ability pupils and have a limited success in teaching occupationally useful skills” (Breen 2005: 126). Accordingly, the vocational credentials in France are regarded as “among the most general awarded in European educational systems” (Kerckhoff 2000: 459).³² On the other hand, a couple of measures were launched towards an implementation of vocational elements into the school system in recent years, such as the introduction of the *baccalauréat professionnel* and the *brevet du technicien supérieur* or the extension of apprenticeships. However, this seems to affect the qualitative dimension of vocational education, whereas the share of people pursuing vocational education has remained at a medium level since the 1990s (Müller and Shavit 1998).

³² The responsibilities for vocational training were transferred to the regions in 2004 (CEDEFOP 2008), which most probably affects more the signalling power of vocational certificates than it affects the number of people enrolled in vocationally oriented tracks.

The stratification of the French education system starts quite late, after the lower secondary level, where students are at the age of 15. The upper secondary and tertiary levels are described as highly stratified (Brauns, Steinmann et al. 1999), because of three different types of *lycées* providing three different *baccalauréats* and the coexistence of universities and *grand écoles*. But in broad international comparative studies, France is assigned a medium level of stratification (Müller and Shavit 1998; Kerckhoff 2000) because of its sorting of students at a late point and because of the fact that all types of *baccalauréats* provide access to university.

The French labour market is characterised by strict employment protection, which is reflected in high values in the OECD's EPL-index. At the same time, a significant segmentation may be observed between those with permanent contracts and those with fixed-term contracts (OECD 2009b). Additionally, France has a relatively high minimum wage level. Both characteristics put young school leavers in a disadvantaged position, as they constitute obstacles to becoming employed on a permanent contract. The main reason for French youth's unfavourable situation, however, are the wage-setting institutions: France has by far the highest difference between union density and bargaining coverage. While only less than 9 per cent of employees are organised in trade unions, the coverage rate of negotiated collective wage agreements is 90 per cent. In other words, a small group of employees (insiders) determine wage and labour conditions for a huge group of employees.

As a result of the institutional features of the French education system and labour market, the chances of accomplishing a favourable transition into the labour market are distributed very unequally across various groups. Those with a migration background and/or with low qualifications suffer to a very high extent from labour market exclusion. The overall level of relative youth unemployment is at an average level, but for disadvantaged groups, there a number of active labour market programmes, and these measures play a structural role in the transition process.

7.5. Germany

Without much of a doubt, Germany belongs to the most investigated countries regarding the transition from school-to-work. It has been included in most broad international comparisons, except when data were not available.³³ The main reason is its dual system of apprenticeship training, which represents a distinctive institutional feature. Therefore, Germany is taken as an ideal type of many theoretical approaches to the topic.

In terms of our comparative grid of institutional characteristics, Germany is considered as a country with a high degree of standardisation (cf. Allmendinger 1989b; Müller and Shavit 1998; Kerckhoff 2000). This is somewhat surprising given

³³ One major exception from this rule are the publications that use the Labour Force Survey Ad-Hoc Module on School-to-Work Transitions (Iannelli 2002; Kogan and Müller 2002), because Germany did not participate.

Germany's federal structure, in which the legal authority over general education is almost entirely located at the regional level. Standardisation, therefore, is high only within the regions, which have a relatively strong influence on schools. But there are two major arguments that justify Germany to be assigned as highly standardised. First, the Standing Committee of Education Ministers (*Kultusministerkonferenz*) works to assure the comparability of curricula and certificates.³⁴ Second, regarding vocational education programmes that take place in the apprenticeship system, standardisation is clearly high at the national level. In this respect, the concept of standardisation shows a crucial weakness: in contrast to the concept of stratification, which can be meaningfully measured and aggregated at the national level, standardisation may vary within one country, given different organisational forms, for instance of vocational and general education, as it is in the case of Germany.

Germany's education system is seen as highly stratified, especially at the secondary level, where students are sorted at the early age of 10, and movements between the three main educational tracks are limited (Brauns, Steinmann et al. 1999: 63). Additionally, the vocational training system is highly stratified itself, whereas the tertiary education system remains relatively unstratified. As Kerckhoff states: "The German educational system is perhaps the clearest current example of a highly stratified system" (2000: 456).³⁵

Vocational specificity is also quite high compared to other OECD countries, which to a large extent is a result of the dual system of apprenticeship training. At the same time, there are quite a few vocational schools in Germany that also contribute to the relatively high share of young people pursuing a vocational education. Not only the vocational specificity of the education system as a whole, but also the specificity of occupational qualifications is high, because employers are involved in the definition of curricula for vocational training, and the duration of apprenticeships is quite long.

As a consequence, the coordination between school and labour market is very high in Germany, and the link between vocational training and employers is clear (Breen 2005: 126). The high level of vocational specificity and the early sorting of children into separate tracks also leads to a relatively high level of social and occupational segmentation in the German labour market (Brauns, Steinmann et al. 1999: 63). The credentials gained in the German education system are "the most directly occupationally relevant." (Kerckhoff 2000: 458). Due to the intensive coordination between qualifications and employers' needs, the matching process on the youth labour market works quite well in terms of avoiding high transaction and search

³⁴ The political debates and manifold reform activities that resulted from Germany's disappointing scores in the first PISA study (OECD 2001), as well as a recent reform of German federalism, have weakened the influence of the federal government on education, and most probably will increase the disparities between the German *Länder*.

³⁵ Kerckhoff (2000) compares only the United States, the United Kingdom, France and Germany. Within this group, Germany of course has the most highly stratified education system. Comparisons involving all OECD countries point into the same direction, however.

costs. Therefore, the relative youth unemployment rate in Germany is one of the lowest among industrialised countries. On the other hand, high segmentation and high vocational specificity lead to low integration chances of early school leavers and those who only gained the lowest credentials (Müller and Shavit 1998: 31).

The unique institutional configuration of Germany also affects the type of policies implemented to integrate young people in the labour market. Usually, school leavers (of secondary education) face two thresholds upon graduation: first, they need to find a traineeship, and second, they need to find employment after having completed vocational training. As a consequence, policies to address youth unemployment are strongly oriented either towards providing the capabilities necessary for training disadvantaged youth, or towards providing support to help them find a job that fits their qualifications. Most of these policies – such as the JUMP (=youth with perspective) programme introduced in 1998 – are targeted at disadvantaged youth, that is, at young migrants, disabled youth or early school leavers. The corporatist structure of the German political system, with its strong emphasis on social dialogue in the field of labour market policies, facilitated a national agreement between the government and the social partners in 2004 in order to consolidate the apprenticeship system: the “National Pact for Training and Young Skilled Staff” (cf. Quintini, Martin et al. 2007). The main reasons for this agreement were the decline in the number of traineeships offered by enterprises and the criticism of enterprises regarding a lack of flexibility in the dual system. The effect of this agreement remains ambiguous: even though there was an immediate increase in the number of traineeships offered, the effects after two years can hardly be observed (BMBF 2006). However, the German school-to-work transition regime continues to perform on a comparatively high level.

7.6. Norway

Because of its relatively good national data infrastructure and its sequential vocational education model, Norway is often recognised in international comparisons regarding school-to-work transitions (cf. Allmendinger 1989a; Hammer 1996; Andersen and Van de Werfhorst 2010). It can be seen as a representative of the group of countries in which vocational education is mainly school-based and decision making in education policy is centralised, whereas vocational training issues are governed by the public administration together with the social partners (Askilden and Nilsen 2005; Farstad 2010).

Regarding the degree of standardisation, the Norwegian education system has been categorised in a differentiated manner: despite Norway’s centralised governance structure, primary education has a low level of standardisation because of regional disparities, whereas secondary education is highly standardised (Allmendinger 1989b). However, because there have been a number of structural changes in the education system since the early 1990s, and because the relevance of local languages continues to decrease, Norway can nowadays be regarded as a thoroughly standardised education system: curricula are defined on a national basis, and there are national exams in general education as well as in vocational programmes (Farstad 2010).

Together with the other Scandinavian countries, the Norwegian education system has quite a low level of stratification compared to the other OECD countries. This holds true for all three indicators: the age at which students are sorted into different school types, the number of school tracks available to 15-years-old, and the composite stratification indicator (OECD 2004b; OECD 2005). Allmendinger (1989b) assigned a high level of stratification to Norway's secondary schools because of the disparities between rural and city areas, and because of the small proportion of students that reached the highest level of the compulsory education system. But because disparities have been decreasing and because many educational reforms have been implemented since, Norway's degree of stratification is now among the lowest in the OECD universe.³⁶

Since the 1994 reform, vocational education in Norway has been organised in a so-called 2+2 scheme, which means that at the age of 16 (when compulsory education ends), students in upper secondary vocational schools spend two years in school receiving theoretical vocational knowledge. This is followed by a company-based apprenticeship that also lasts two years (Quintini, Martin et al. 2007; Farstad 2010). It is estimated that within this model of vocational training, around 20 per cent of a youth cohort is engaged in vocational training (OECD 2008a). Therefore, vocational specificity in Norway is quite high, even if it is not as high as in the classic dual system countries, such as Germany, Austria and Switzerland. Apart from the 2+2 scheme, another Norwegian peculiarity is a type of post-secondary vocational education that extends upper secondary vocational education but is not recognised as higher education, but as continuing vocational training (CEDEFOP 2010; Farstad 2010).

Youth unemployment in Norway provides an ambiguous picture: whereas the absolute rate of unemployment for 15-24-year-olds is clearly below the OECD average, relative youth unemployment is between 3 and 4 – meaning that youth unemployment is 3 to 4 times higher than adult unemployment, which is because of the very low unemployment rate among adults. In part, this difference is due to the high level of employment protection in combination with high entry wages that may lead to lower job opportunities for young people (OECD 2008a). Since youth labour markets are more sensitive to the economic cycle, the situation for young job entrants in case of an economic downturn could worsen considerably.

Despite not being a member of the European Union, Norway participates in several EU programs and institutional arrangements regarding education and training (e.g. CEDEFOP). Since the early 1990s, there have been several fundamental reforms in Norway's education system (e.g. the 1994 Education Act or the 1996 Knowledge Promotion Reform, which introduced an output orientation in primary and secondary education) that served to strengthen vocational education, created

³⁶ One could argue that this might be an effect of different reference groups between Allmendinger's work and the OECD study, but the most important factor for relocating Norway's education system is its institutional change because of educational reforms.

common curricula, and enhanced permeability between academic and VET tracks. In Norway, young people under 20 years who cannot find a job and who have left the education system are offered vocational training opportunities according to the so-called Youth Guarantee (YG). Apart from that, employment programmes (incl. wage subsidies) play a role in the Norwegian ALMP.

7.7. United Kingdom

Together with Germany and France, the United Kingdom³⁷ belongs to the most researched countries regarding school-to-work transitions. In most classifications of education and employment systems, the UK serves as an ideal type – for example, as an organisational space (Müller and Shavit 1998: 11) in the classification by Maurice, Sellier et al. (1986). Interestingly, its assignment to a certain type within the ILM-OLM dichotomy varies according to the countries included in the classification. For example, when comparing France and the UK, Eyraud, Marsden et al. argued that the UK vocational system offers occupationally standardised skills and, therefore, constitutes an OLM system (1990: 504-5). On the other hand, Brauns, Gangl et al., in their comparison of Germany, France and the UK, classify the UK as an ILM system, because “apprenticeships have not attained the same prestige as in Germany nor the same wide diffusion across all economic sectors” (1999: 5). Hence, a satisfying attribution of the UK institutional regime regarding school-to-work transitions requires a comparison with many countries, as is done in this dissertation.

Despite many initiatives since the early 1990s to centralise education, the secondary education system in the UK is less standardised than that in France or Germany (Kerckhoff 2000: 457). But standardisation or, in political terms, the national influence on schools as opposed to local control has been the subject of intensive debates. Centralisation has increased since the 1960s, when comprehensive schools were introduced. Although the exams taken at the end of primary school are national exams, and the General Certificate of Secondary Education (GCSE), awarded at the end of lower secondary education, is relatively standardised (Whatford 2010: 551-2), vocational and post-secondary education remains somewhat unstandardised (cf. Heath and Cheung 1998: 74; Müller and Shavit 1998: 12). Because standardisation is mostly applied to the secondary level of education, the United Kingdom has quite a high value in the standardisation indicator.

The stratification of the UK education system has undergone major change since the 1950s, when it was characterised as a system of “sponsored mobility”, whereas the United States were characterised as a system of “contest mobility” (Turner 1960). Since the educational reforms of the 1960s, the stratifying effect has changed from being based on the type of school to being based on certificates (Heath and Cheung

³⁷ The education and training systems of England, Scotland and Wales differ to a certain extent, but the differences between Wales and England are negligible, and those between England and Scotland remain small when compared to other countries. For a detailed description, see Raffé (1998; 2010).

1998: 71). Kerckhoff (2004: 253) assesses the UK as being “somewhat stratified” and locates it between the US (low stratification) and Germany (high stratification), whereas Müller and Shavit describe the UK as lowly stratified (1998: 12), a claim supported by the indicators created by the OECD.

In the UK, “vocational education in general has always been of secondary importance” (Brauns, Gangl et al. 1999: 5), even if there is a long tradition of apprenticeships. Traditionally, vocational qualification took place within the firm as on-the-job training, but since the educational reforms in the 1960s, there was a “tendency for vocational training to shift out of the workplace” (Heath and Cheung 1998: 74), so that vocational training (including apprenticeships) became a very unstructured system providing a variety of vocational credentials that are neither standardised nor occupation-specific (Kerckhoff 2000). This is the reason why the United Kingdom has a relatively high proportion of upper-secondary students and why Müller and Shavit characterise the country’s vocational specificity as being on a medium level (Müller and Shavit 1998: 12).

The UK labour market can be characterised as flexible, with weak labour market regulation, weak occupational labour markets, and prevailing internal labour markets (e.g. Brauns, Gangl et al. 1999: 5; Raffe 2010: 770). In terms of the Varieties of Capitalism approach, the United Kingdom is a deregulated liberal market economy (Hall and Soskice 2001b). Consequently, employment protection is among the lowest in the OECD (OECD 2008b: 126) – only the US show lower values in the EPL indicator – and the indicators of wage-setting institutions (union density and bargaining coverage) point into the same direction. Since the youth labour market collapsed in the late 1970s and early 1980s (Bynner 2001: 12), youth unemployment has remained on a quite high level. The situation of young labour market entrants deteriorated seriously between 1990 and 2008, because relative youth unemployment increased from a value of 2 to 4, which means that young people under 24 are four times more likely to be unemployed than adult employees.

After the sharp increase in youth unemployment in the early 1980s, British government policies were strongly focused on developing youth training schemes as measures of active labour market policies and on lowering youth wages (cf. Bynner 2001: 8; Canny 2001: 135). Unfortunately, the economic recovery of the late 1990s did not improve young people’s labour market situation; as a result, current figures provide an unfavourable picture of the youth labour market. In 1998, the Labour government started the “New Deal for Young People” (NDYP), which had the objective of improving the employability of long-term unemployed youth and helping them find a job (OECD 2008b: 19).³⁸ Together with a couple of other ALMP

³⁸ Evaluations of the New Deal show positive effects regarding the way the programme was perceived by participants (Ritchie 2000) and employers (Elam and Snape 2000), as well as regarding young people’s first transition into employment. Its long-term effects remain unclear, however (van Reenen 2003; Wilkinson 2003; De Giorgi 2005). These findings point to the argument that labour market entry processes do not stop after the first job entry, but must be analysed in a long-term perspective.

measures, the NDYP represents a change from “passive to active management of employment benefits” (OECD 2008b).

7.8. United States

Like Germany, France and the United Kingdom, the United States are often included in international comparative research projects regarding school-to-work transitions, frequently serving as an ideal type (e.g. Allmendinger 1989b; Shavit and Blossfeld 1993; Shavit and Müller 1998; Stern and Wagner 1999; Kerckhoff 2000; Quintini and Manfredi 2009; Raffe 2009; Bosch and Charest 2010). The same is true of institutional studies on education systems as well as for research on labour market and welfare issues (cf. Esping-Andersen 1990; Hall and Soskice 2001b; Traxler, Blaschke et al. 2002; Thelen 2004).³⁹ The United States represent the ideal type of the liberal welfare state, the liberal market economy, an unregulated labour market, an organisational space, and an internal labour market.

Hence, the degree of standardisation in the US education system is very low: curricula, school organisation and academic criteria differ between states, regions and schools, which have a relatively high degree of autonomy (Allmendinger 1989b: 233; Müller and Shavit 1998: 12; Pusser and Lloyd 2010: 891). Additionally, Kerckhoff points out that the federal government has little influence on education (2000: 457), whereas the state governments do exert substantial control (Kerckhoff 2000: 460; Kerckhoff 2004: 253). This points to a specific problem regarding this institutional indicator when it comes to countries with a federal system of government: standardisation always refers to the national level, but not to the state level. As a consequence, the US show relatively high values in the different dimensions of standardisation, such as government influence and school autonomy, although the US federal government has only very limited influence or, as Hout, Raftery et al. put it: “National educational policy is virtually nonexistent [...]” (1993: 26).⁴⁰ However, since the early 2000s, the federal government has launched two programmes (“Good Start, Grow Smart” and “No Child Left Behind”), that increased the federal government’s influence on schools and, therefore, increase standardisation (OECD 2009c: 15).

Regarding the degree of stratification in the US education system, researchers agree that it shows a comparatively low degree of stratification (Allmendinger 1989b: 236; Müller and Shavit 1998: 12; Kerckhoff 2004: 253). Kerckhoff argues that the

³⁹ However, there are also a number of studies that only involve European countries (Kieselbach 2000; Walther and Stauber 2002; Müller and Gangl 2003; Bradley and van Hoof 2005). We may safely assume, however, that this is mainly due to the European data infrastructure, which features several harmonised datasets, which however only include European countries. The unique institutional characteristics of the United States are the obvious reason why the US are in most cases considered in comparative school-to-work transition research.

⁴⁰ A differentiated examination of secondary and tertiary education reveals a distinct high level of standardisation for higher education in the US (Allmendinger 1989b: 237).

stratification of the US education system is low because of “its open structure and its lack of irrevocable branching points” (2000: 457). The dimensions of stratification show the expected values: the age at which students are sorted into different school types is among the highest in the OECD countries, and there is only one school track available to 15-year-olds. Hence, the stratification index also is relatively low.

One of the peculiarities of the US education system is the lack of vocational programmes in the school system. As a consequence, vocational specificity is also relatively low (Müller and Shavit 1998: 12). Additionally, the credentials school leavers obtain for vocational courses have more of a general academic than a specific vocational character (Hout, Raftery et al. 1993: 28; Kerckhoff 2000: 458; Kerckhoff 2004: 253). Quintini and Manfredi find that there is “no vocational education route in mainstream upper secondary education” (2009: 10). Vocational education and training in the United States is traditionally work-related preparation at a lower level (Bailey and Berg 2010: 271). Relevant skills are generally obtained in form of on-the-job-training, while the apprenticeship system in the US “represents a relatively minor and declining educational pathway”, because it only exists in unionised sectors, such as the construction sector (Bailey and Berg 2010: 280). Therefore, the institutional linkages between the school system and the labour market are very weak and informal in the United States (Arum and Hout 1998: 474; Bailey and Berg 2010: 271), which means that the link between educational credentials and specific jobs or occupations is very weak, too. The signal to employers is more provided by the achieved level of general education than by credentials (Bailey and Berg 2010: 291). The United States comply with what Maurice, Sellier et al. have defined as “organisational space” (Maurice, Sellier et al. 1986).

US labour market institutions are also very much in line with the model of a “liberal market economy” (Hall and Soskice 2001b). The OECD indicator of employment protection legislation for the US always shows the lowest values among all OECD countries (cf. Quintini and Manfredi 2009). The values for union density and bargaining coverage are also the lowest across the OECD, and the minimum wage level is quite low as well (OECD 2009c: 139). Thus the relative youth unemployment rate varies according to the economic cycle between 2.2 and 4 – that is, the youth unemployment rate is four times higher than the overall unemployment rate. This indicates that youth is more vulnerable in times of economic downturn. Except for cyclic changes, the long-term trend (1990-2008) shows no significant improvement or deterioration. Early labour market experiences in the United States are relatively unstable and show “high rates of job turnover in non-unionised employment situations” (Arum and Hout 1998: 473).

Active labour market policy programmes regarding youth labour market problems have always played a minor role in the United States and mostly are oriented at increasing the employability of school leavers. The youth programmes share some key characteristics: the investments per capita are high and the duration is long, mostly including qualification programmes, and they are rigorously evaluated (OECD 2009c: 178).

8. Summary & Outlook

The articles subsumed in this doctoral thesis are designed to promote the research on school-to-work transitions. Although a number of efforts and a rich body of literature already exist on this topic, four crucial questions remain unanswered, as discussed in section 2.

- 1) First, there is no theory of school-to-work transitions, although the topic remains an important one for social science researchers and policy makers alike. The theoretical approach remains eclectic, because only theories exist that can be applied to certain specific questions. The particular question that has been posed is, “How do institutional frameworks influence school-to-work transitions?”
- 2) Second, the assumption that globalisation and increasing international integration lead to a convergence of institutions, made from a variety of theoretical perspectives, cannot be observed regarding school-to-work transitions, where differences persist. The respective research question is, “Why is there no convergence to be observed?”
- 3) Third, although the analysis of institutional effects shows a number of very prominent developments, it remains at a relatively basic level conceptually. On the one hand, institutions are seen as complementary and affecting individual behaviour in combination with each other; on the other hand, they continue to be analysed as single variables. Looking for regime effects, one has to answer the question whether there are conjunctural effects of institutional configurations (regimes) on school-to-work transitions.
- 4) Fourth, at the micro level, transitions are only analysed as single events, not as processes. Given the increasing size of datasets and the increasing complexity of observable processes, the question arises how one can explore and measure transition processes of undetermined length.

The individual articles of this dissertation address these overarching questions in many ways (see section 6). Although the theoretical gap in school-to-work transition research could not be closed, a remarkable step in that direction has been made. The identification of conjunctural effects of labour market and educational institutions on school-to-work transitions (section 6.4) provides the basis for deriving such kinds of theories. Developing a general theory requires the identification of causal mechanisms that are applicable to a large number of observations. There is evidence to suggest that single institutional characteristics show certain effects in one country but not in another. The existing methodological toolbox does not allow for an appropriate analysis of complex causality (see section 5.2); applying QCA, therefore, marks progress towards this direction. Apart from that, a (pre-)theoretical construction is required that is flexible enough to integrate such findings. The concept of Transitional Labour Markets (see section 6.5) may serve this purpose, as it does not have any rigid premises and, therefore, provides openness.

The second question (regarding the lack of convergence despite increasing integration at least at the European level) and the third question (regarding conjunctural effects) can now be answered with the help of the term of *functional equivalence*, which describes different institutions or policies that are different in form while fulfilling the same functions (see section 6.4). That means that even if convergence does occur across countries with respect to certain functions demanded by the labour market or education institutions, the institutions themselves may differ in each country, as long as they fulfil the same tasks. Thus there is no need for institutional change when the demand for a certain function is satisfied by other (combinations of) institutions.

The fourth question (regarding the analysis of transitions as processes) is addressed by developing and applying the exploratory method of sequence analysis, which is capable of using the rich information longitudinal data comprise (sections 6.1 and 6.2). The information gained from this new methodological tool is connected to standard hypothesis-testing methods (section 6.3).

Regarding these four overarching research questions, my dissertation provides substantial scientific progress. The single articles themselves also answer a couple of additional minor research questions (section 6). However, the work compiled here also provides starting points for further studies. First and foremost, this concerns the following issues:

- The QCA results are explorative in nature, meaning they can only detect effects. Therefore, the findings should be tested intensely by using multilevel models, for example. Additionally, the within-variation in single countries needs to be examined further in order to qualify the effect at the macro-level. This is important because institutional characteristics at the country level (e.g. the strictness of employment protection) unfold their effects disproportionately for different groups (e.g. persons in fixed-term employment or standard employment).
- The comparative data, mainly provided by the OECD, should be complemented by further institutional characteristics that need to be generated. The number of labour market and education institutions examined here is limited because of data restrictions. In order to gain more valuable results, additional variables of institutional characteristics should be included. For example, there is a lack of comparable information across countries and across time regarding expenses on active youth labour market policies.
- Even more (longitudinal) individual characteristics – as dependent variables – should be available in international comparison. This concerns information on individual satisfaction, relative income mobility, or promotion chances. The major problem here is the lack of internationally harmonised datasets. After

the termination of the European Community Household Panel (ECHP), no comparable resource has become available, not even at the European level.⁴¹

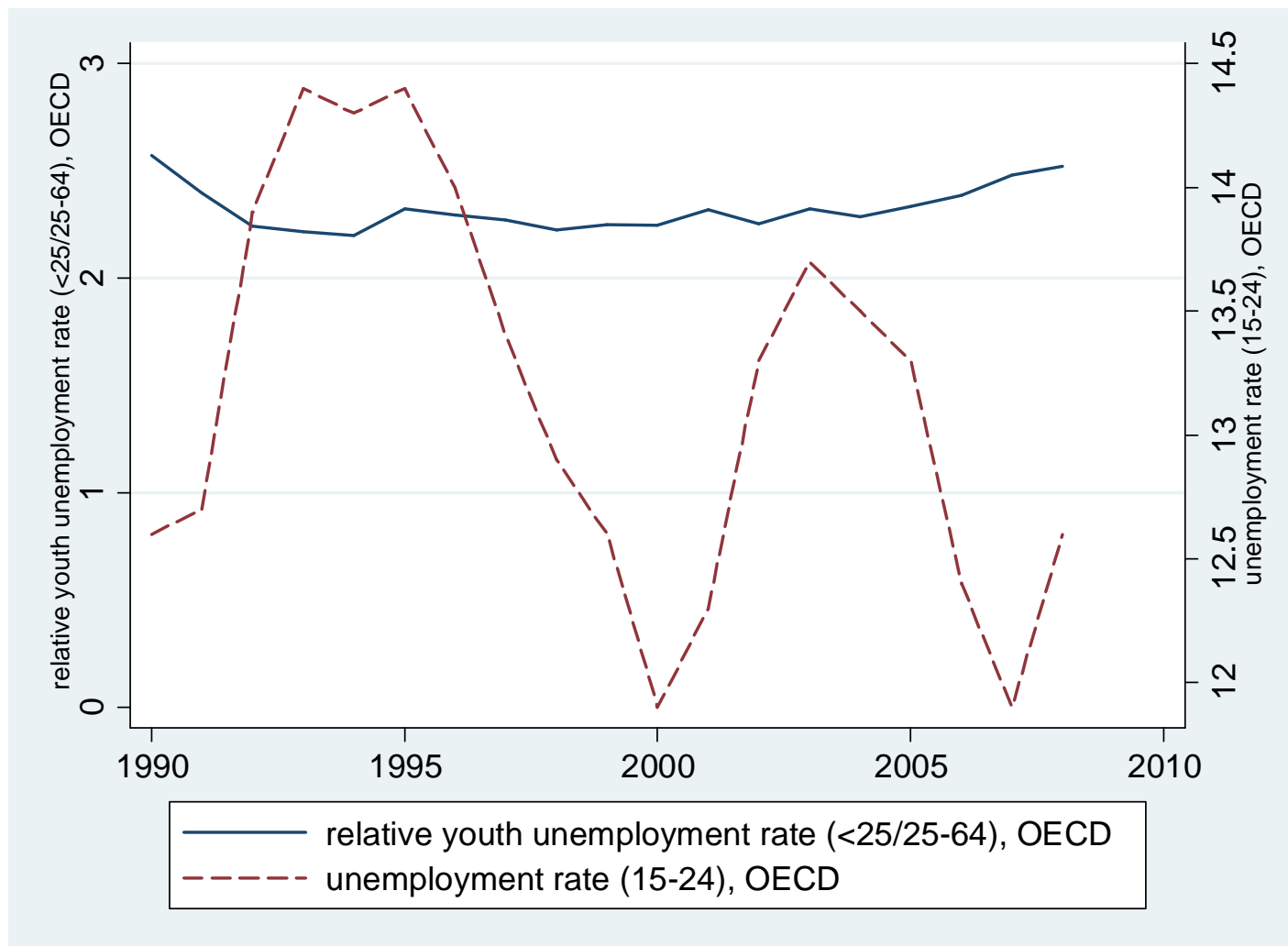
- Finally, the major challenge is to include further (non-OECD) countries, which is difficult not only because the OECD countries are the most important data producers but also because transition systems in Western industrialised countries and in developing countries are difficult to compare. However, this depends very much on the purpose of theory development.

The tasks described above suggest at least one large-scale research project, due to the number of countries that have to be involved and the manifold institutional features that have to be taken into account to overcome the “juxtaposed case-study” approach that most comparative studies have followed. The objective to establish a common “variable-grid” research design is another reason for adopting an integrated approach. Hence, the agenda for future school-to-work transition research provides multiple challenges, some of which are addressed in this dissertation.

⁴¹ The successor data resource, the European Union Survey of Income and Living Conditions (EU-SILC), is only a rotating panel in which one quarter of respondents is replaced each year, meaning that individuals can only be analysed for a period of three years.

Appendix

A1. Youth Unemployment Rate and Relative Youth Unemployment Rate in the OECD, 1990-2008



A2. Multinomial Logit Model from Third Article (section 6.3)

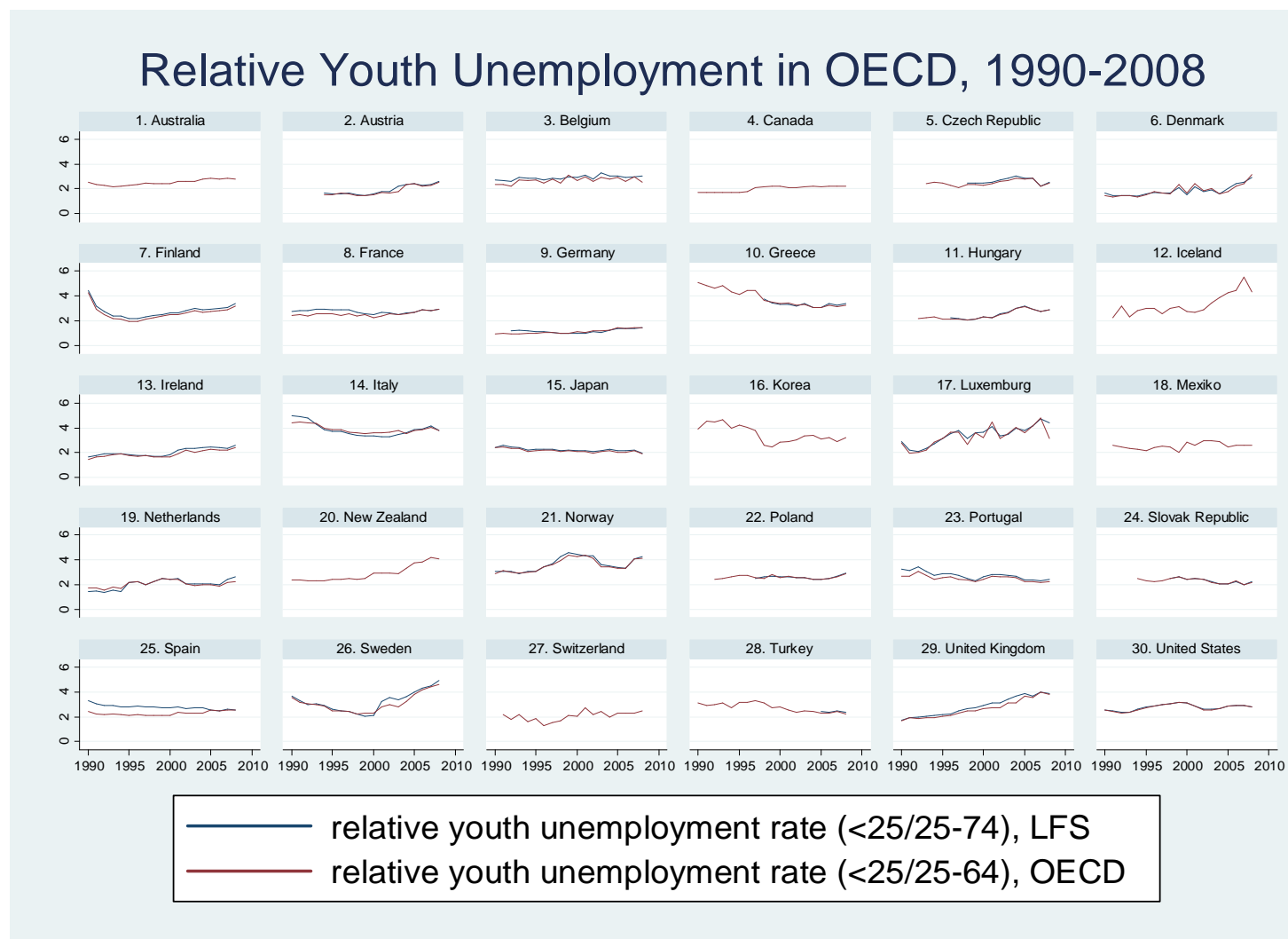
Cluster	Educational level				Country								
	medium	high	non-nationals	women	BEL	FRA	IRE	ITA	GRE	ESP	POR	GER	UK
Return	4.20 ***	2.74 ***	<i>n.s.</i>	<i>n.s.</i>	-21.55 ***	-20.51 ***	-6.71 ***	-5.62 ***	-25.14 ***	-4.97 ***	-8.27 ***	-13.45 ***	-28.78 ***
Failure	-2.69 ***	-4.77 ***	<i>n.s.</i>	1.44 ***	-2.75 ***	-5.18 ***	-2.55 ***	4.03 ***	<i>n.s.</i>	1.68 ***	-4.15 ***	-4.30 ***	-5.12 ***
Dropout	-7.99 ***	-22.60 ***	3.56 ***	6.32 ***	-9.51 ***	-15.36 ***	-4.23 ***	1.56 ***	<i>n.s.</i>	-1.56 **	-2.42 ***	-11.16 ***	-5.82 ***
Link	1.54 *	2.16 ***	<i>n.s.</i>	<i>n.s.</i>	-10.00 ***	-25.93 ***	-5.23 ***	-11.09 ***	-20.85 ***	-5.40 ***	-5.45 ***	-18.40 ***	-15.34 ***
Break	-2.10 ***	-2.43 ***	<i>n.s.</i>	-1.36 **	-11.72 ***	-3.50 ***	-9.04 ***	<i>n.s.</i>	<i>n.s.</i>	-1.51 *	<i>n.s.</i>	-2.93 ***	-4.99 ***
Detour	-1.55 ***	-2.19 ***	2.11 *	<i>n.s.</i>	-3.17 ***	-6.14 ***	-3.54 ***	1.45 **	-1.55 **	<i>n.s.</i>	-1.89 ***	-9.23 ***	-4.39 ***
Bridge	1.40 *	-2.45 ***	-2.22 ***	1.04	-16.70 ***	<i>n.s.</i>	-5.38 ***	-5.02 ***	-28.75 ***	-7.21 ***	-45.20 ***	2.06 ***	-10.41 ***
N	4005												
Pseudo R²	0.24												

The coefficients are relative risk ratios. For values between 0 and 1 the reciprocal is calculated in the interests of interpretative clearness. Express is the base outcome, reference categories: Denmark & low level of education. Significance levels: *** = $p < 0.01$; ** = $p < 0.05$; * = $p < 0.1$. Source: Brzinsky-Fay (2008)

A3. Fuzzy-Values as Basis for the Fourth Article (section 6.4)

country	outcomes		conditions						
	relative youth unemployment	NEET rate	employment protection legislation	union density	vocational specificity	net replacement rate	range of reading competancies	standardisation	stratification
AUS	0.41	0.44	0.14	0.45	0.59	0.04	0.52	0.47	0.24
AUT	0.07	0.23	0.52	0.69	0.86	0.18	0.76	0.16	0.86
BEL	0.66	0.65	0.66	0.83	0.79	0.84	1.00	0.55	0.93
CAN	0.14	0.54	0.07	0.52	0.03	0.51	0.24	0.22	0.28
CZ	0.38	0.47	0.45	0.72	1.00	0.21	0.72	0.33	0.72
DK	0.03	0.05	0.41	0.90	0.48	1.00	0.17	0.76	0.10
FIN	0.55	0.33	0.48	0.93	0.62	0.61	0.03	0.16	0.03
FRA	0.52	0.37	0.79	0.00	0.52	0.75	0.55	0.80	0.83
GER	0.00	0.40	0.69	0.38	0.93	0.32	0.97	0.91	0.97
GRC	0.97	0.86	0.93	0.48	0.28	0.07	0.79	0.69	0.38
HUN	0.34	0.82	0.28	0.34	0.24	0.41	0.31	0.07	0.62
ISL	0.83	0.00	0.24	1.00	0.31	0.64	0.38	1.00	0.00
IRL	0.10	0.19	0.10	0.76	0.07	0.00	0.14	0.62	0.48
ITA	1.00	0.93	0.72	0.66	0.45	0.29	0.66	0.25	0.66
JAP	0.24	0.16	0.34	0.28	0.21	0.57	0.41	0.04	0.45
KOR	0.90	0.72	0.55	0.03	0.34	0.11	0.00	0.36	0.41
LUX	0.86	0.12	0.90	0.79	0.76	0.96	0.69	1.00	0.90
MEX	0.48	0.96	0.83	0.17	0.14	0.20	0.28	0.65	0.76
NL	0.21	0.00	0.59	0.31	0.83	0.68	0.10	0.80	1.00
NZ	0.76	0.61	0.21	0.41	0.10	0.14	0.93	0.95	0.21
NOR	0.93	0.09	0.76	0.86	0.66	0.54	0.86	0.84	0.07
POL	0.59	0.75	0.31	0.59	0.72	0.71	0.59	0.00	0.34
POR	0.45	0.51	0.97	0.24	0.17	0.84	0.47	0.87	0.69
SVK	0.31	0.89	0.38	0.62	0.97	0.46	0.62	0.58	0.59
ESP	0.28	0.79	0.86	0.14	0.38	0.79	0.07	0.44	0.52
SWE	0.79	0.30	0.62	0.97	0.55	0.89	0.34	0.29	0.14
SWI	0.17	0.26	0.17	0.21	0.90	0.93	0.47	0.11	0.55
TUR	0.72	1.00	1.00	0.10	0.41	0.36	0.21	0.73	0.79
UK	0.62	0.68	0.03	0.55	0.69	0.25	0.83	0.40	0.31
USA	0.69	0.58	0.00	0.07	0.00	0.41	0.90	0.51	0.17

A4. Relative Youth Unemployment Rates in OECD countries, 1990-2008



References

- Aassve, A., F. C. Billari, et al. (2007). "Strings of Adulthood: A Sequence Analysis of Young British Women's Work-Family Trajectories." European Journal of Population **23**(3-4): 369-388.
- Abbott, A. (1983). "Sequences of Social Events: Concepts and Methods for the Analysis of Order in Social Processes." Historical Methods **16**(4): 129-147.
- Abbott, A. and J. Forrest (1986). "Optimal matching methods for historical sequences." Journal of Interdisciplinary History **16**(3): 471-494.
- Abbott, A. and A. Hrycak (1990). "Measuring Resemblance in Sequence Data. An Optimal Matching Analysis of Musicians' Careers." American Journal of Sociology **96**(1): 144-185.
- Aho, E., K. Pitkänen, et al. (2006). Policy Development and Reform Principles of Basic and Secondary Education in Finland since 1968. Washington, D.C., World Bank.
- Allmendinger, J. (1989a). Career Mobility Dynamics. A Comparative Analysis of the United States, Norway, and West Germany. Berlin, Max-Planck-Institut für Bildungsforschung.
- Allmendinger, J. (1989b). "Educational Systems and Labor Market Outcomes." European Sociological Review **5**(3): 231-250.
- Andersen, R. and H. G. Van de Werfhorst (2010). "Education and Occupational Status in 14 Countries: the Role of Educational Institutions and Labour Market Coordination." British Journal of Sociology **61**(2): 336-355.
- Arnkil, R. and T. Spangar (2001). Comparing Recent Danish, Finnish and Swedish Labour Market Policy Reforms. Berlin, Wissenschaftszentrum Berlin.
- Arts, W. and J. Gelissen (2002). "Three Worlds of Welfare Capitalism or More? A State-of-the-Art Report." Journal of European Social Policy **12**(2): 137-158.
- Arulampalam, W. (2001). "Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages." Economic Journal **111**(475): 585-606.
- Arum, R. and M. Hout (1998). The Early Returns. The Transition from School to Work in the United States. From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations. Y. Shavit and W. Müller. Oxford, Clarendon Press: 471-510.
- Ashton, D. N. (1988). "Sources of Variation in Labour Market Segmentation: A Comparison of Youth Labour Markets in Canada and Britain." Work, Employment and Society **2**(1): 1-24.

- Askilden, J. E. and Ø. A. Nilsen (2005). "Apprentices and Young Workers: A Study of the Norwegian Youth Labour Market." Scottish Journal of Political Economy **52**(1): 1-17.
- Aus, J. P. (2009). "Conjunctural Causation in Comparative Case-Oriented Research." Quality & Quantity **43**(2): 173-183.
- Bagnall, N. F. (2000). "The Balance between Vocational Secondary and General Secondary Schooling in France and Australia." Comparative Education **36**(4): 459-475.
- Bailey, T. and P. Berg (2010). The Vocational Education and training System in the United States. Vocational Training. International Perspectives. G. Bosch and J. Charest. New York / London, Routledge: 271-294.
- Bell, D., N.F. and D. G. Blanchflower (2010). Youth Unemployment: Déjà Vu? Bonn, IZA Discussion Paper.
- Berger, P. A., P. Steinmüller, et al. (1993). "Differentiation of Life-Courses? Changing Patterns of Labour Market Sequences in West Germany." European Sociological Review **9**(1): 43-65.
- Bernard, H. R. (2000). Social Research Methods. Qualitative and Quantitative Approaches. Thousand Oaks/London/New Dehli, Sage.
- Billari, F. C. and R. Piccarreta (2005). "Analyzing Demographic Life Courses Through Sequence Analysis." Mathematical Population Studies **12**(2): 81-106.
- Blair-Loy, M. (1999). "Career Patterns of Executive Women in Finance: An Optimal Matching Analysis." American Journal of Sociology **104**(5): 1346-1397.
- Blossfeld, H.-P., K. Golsch, et al. (2007). Event History Analysis with Stata. Mahwah / London, Lawrence Erlbaum Associates.
- BMBF (2006). Report on Vocational Education and Training. Berlin, BMBF.
- Borrás, S. and K. Jacobsson (2004). "The Open Method of Co-ordination and New Governance Patterns in the EU." Journal for European Public Policy **11**(2): 185-208.
- Bosch, G. and J. Charest, Eds. (2010). Vocational Training. International Perspectives. New York, Routledge.
- Bradley, H. and J. van Hoof, Eds. (2005). Young People in Europe. Labour Markets and Citizenship. Bristol, Policy Press.
- Brady, H. E. and D. Collier (2004). Rethinking Social Inquiry. Diverse Tools and Shared Standards. Lanham, Rowman & Littlefield.

- Brauns, H., M. Gangl, et al. (1999). Education and Unemployment: Patterns of Labour Market Entry in France, the United Kingdom and West Germany. Mannheim, Mannheimer Zentrum für Europäische Sozialforschung.
- Brauns, H., S. Scherer, et al. (2003). The CASMIN Educational Classification in International Comparative Research. Advances in Cross-National Comparison. A European Working Book for Demographic and Socio-Economic Variables. J. H. P. Hoffmeyer-Zlotnik and C. Wolf. New York, Kluwer Academic/Plenum Publishers: 221-244.
- Brauns, H., S. Steinmann, et al. (1999). "Does Education Matter? France and Germany in Comparative Perspective." European Sociological Review **15**(1): 61-89.
- Bredgaard, T., F. Larsen, et al. (2006). "Opportunities and Challenges for Flexicurity - the Danish Example." Transfer: European Review of Labour and Research **12**(1): 61-82.
- Bredgaard, T., F. Larsen, et al. (2009). Flexicurity and Atypical Employment in Denmark. Aalborg.
- Breen, R. (2005). "Explaining Cross-National Variation in Youth Unemployment. Market and Institutional Factors." European Sociological Review **21**(2): 125-134.
- Brzinsky-Fay, C. (2007). "Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe." European Sociological Review **23**(4): 409-422.
- Brzinsky-Fay, C. (2008). Get the Balance Right: The Sequence Approach as a Tool for Flexicurity Policies in the School-to-Work Transition. Innovating European Labour Markets. Dynamics and Perspectives. P. Ester, R. Muffels, J. Schippers and T. Wilthagen. Cheltenham/Northampton, Edward Elgar: 275-296.
- Brzinsky-Fay, C. (2010). The Concept of Transitional Labour Markets. A Theoretical and Methodological Inventory. Berlin, Wissenschaftszentrum Berlin.
- Brzinsky-Fay, C. and U. Kohler (2010). "New Developments in Sequence Analysis." Sociological Methods & Research **38**(3): 359-364.
- Brzinsky-Fay, C., U. Kohler, et al. (2006). "Sequence Analysis Using Stata." Stata Journal **6**(4): 435-460.
- Bynner, J. (2001). "British Youth Transitions in Comparative Perspective." Journal of Youth Studies **4**(1): 5-23.
- Bynner, J., L. Chisholm, et al., Eds. (1997). Youth, Citizenship and Social Change in a European Context. Aldershot, Ashgate.
- Canny, A. (2001). "The Transition from School to Work: An Irish and English Comparison." Journal of Youth Studies **4**(2): 133-154.

- CEDEFOP (2006). Vocational Education and Training in Finland. Thessaloniki, CEDEFOP.
- CEDEFOP (2008). Vocational Education and Training in France. Short Description. Thessaloniki, CEDEFOP.
- CEDEFOP (2010). Norway, VET in Europe - Country Report 2010. Oslo, CEDEFOP.
- Cohen, P. and P. Ainley (2000). "In the Country of the Blind?: Youth Studies and Cultural Studies in Britain." Journal of Youth Studies 3(1): 79-95.
- Collier, D. and R. Messick (1975). "Prerequisites Versus Diffusion: Testing Alternative Explanations of Social Security Adoption." American Political Science Review 69(4): 1299-1315.
- Coppedge, M. (1999). "Thickening Thin Concepts and Theories. Combining Large N and Small in Comparative Politics." Comparative Politics 31(4): 465-476.
- de Vries, M. R. and M. H. J. Wolbers (2005). "Non-Standard Employment Relations and Wages Among School Leavers in the Netherlands." Work, Employment and Society 19(3): 503-525.
- DiMaggio, P. J. and W. W. Powell (1983). "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields." American Sociological Review 48(2): 147-160.
- DiPrete, T. A. and P. A. McManus (2000). "Family Change, Employment Transitions, and the Welfare State: Household Income Dynamics in the United States and Germany." American Sociological Review 65(3): 343-370.
- Doeringer, P. and M. Piore (1971). Internal Labour Markets and Manpower Analysis. Lexington, Mass. Lexington Books.
- Dolton, P., R. Asplund, et al., Eds. (2009). Education and Inequality across Europe. Cheltenham/Northampton, Edward Elgar.
- Dworkin, R. (2000). Sovereign Virtue. The Theory and Practice of Equality. Cambridge/London, Harvard University Press.
- Dwyer, P. and J. Wyn (1997). "Post-compulsory education policy in Australia and its impact on participant pathways and outcomes in the 1990s." Journal of Education Policy 13(3): 285-300.
- Ebbinghaus, B. (2005). "When Less is More. Selection Problems in Large-N and Small-N Cross-National Comparisons." International Sociology 20(2): 133-152.
- Edwards, R. C., M. Reich, et al., Eds. (1975). Labor Market Segmentation. Lexington / Toronto / London, D.C. Heath and Company.

- EGRIS (2001). "Misleading Trajectories: Transition Dilemmas of Young Adults in Europe." Journal of Youth Studies **4**(1): 101-118.
- Elam, G. and D. Snape (2000). New Deal for Young People: Striking a Deal with Employers. London, National Center for Social Research.
- Ellwood, D. T. (1982). Teenage Unemployment: Permanent Scars or Temporary Blemishes? The Youth Labor Market Problem: Its Nature, Causes, and Consequences. R. B. Freeman and D. A. Wise. Chicago, University of Chicago Press: 349-390.
- Elzinga, C. H. (2003). "Sequence Similarity. A Nonaligning Technique." Sociological Methods & Research **32**(1): 3-29.
- Elzinga, C. H. and A. C. Liefbroer (2007). "De-standardization of Family-Life Trajectories of Young Adults: A Cross-National Comparison Using Sequence Analysis." European Journal of Population **23**(3-4): 225-250.
- Emmenegger, P. (2009). "Barriers to Entry: Insider/Outsider Politics and the Political Determinants of Job Security Regulations." Journal of European Social Policy **19**(2): 131-146.
- Erikson, R. and J. H. Goldthorpe (1992). The Constant Flux: A Study of Class Mobility in Industrial Societies. Oxford, Clarendon Press.
- Esping-Andersen, G. (1990). The Three Worlds of Welfare Capitalism. Cambridge, Polity Press.
- Esping-Andersen, G. (1999). Social Foundations of Postindustrial Economies. Oxford, Oxford University Press.
- Esping-Andersen, G. (2000). Who is Harmed by Labour Market Regulations? Quantitative Evidence. Why Deregulate Labour Markets? G. Esping-Andersen and M. Regini. Oxford, Oxford University Press: 66-98.
- Estevez-Abe, M., T. Iversen, et al. (2001). Social Protection and the Formation of Skills: A Reinterpretation of the Welfare State. Varieties of Capitalism. The Institutional Foundations of Comparative Advantage. P. A. Hall and D. Soskice. Oxford, Oxford University Press: 145-183.
- Evans, K. and A. Furlong (1997). Metaphors of Youth Transitions: Niches, Pathways, Trajectories or Navigations. Youth, Citizenship and Social Change in a European Context. J. Bynner, K. Evans and A. Furlong. Aldershot, Ashgate.
- Eyestone, R. (1977). "Confusion, Diffusion, and Innovation." American Political Science Review **71**(2): 441-447.
- Eyraud, F., D. Marsden, et al. (1990). "Occupational and Internal Labour Markets in Britain and France." International Labour Review **129**(4): 501-517.

- Farstad, H. (2010). Norway. International Encyclopedia of Education. P. Peterson, E. Baker and B. McGraw. Oxford, Elsevier: 709-717.
- Fenton, S. and E. Dermott (2006). "Fragmented Careers? Winners and Losers in Young Adult Labour Markets." Work, Employment and Society 20(2): 205-221.
- Furlong, A. (2006). "Not a very NEET Solution. Representing Problematic Labour Market Transitions among Early School-Leavers." Work, Employment and Society 20(3): 553-569.
- Gangl, M. (2003a). "The Only Way is Up? Employment Protection and Job Mobility among Recent Entrants to European Labour Markets." European Sociological Review 19(5): 429-449.
- Gangl, M. (2003b). The structure of labour market entry in Europe: a typological analysis. Transitions from education to work in Europe. W. Müller and M. Gangl. Oxford, Oxford University Press: 95-116.
- Gangl, M. (2004). "Welfare States and the Scar Effects of Unemployment: A Comparative Analysis of the United States and West German." American Journal of Sociology 109(6): 1319-1364.
- Gangl, M. (2006). "Scar Effects of Unemployment: An Assessment of Institutional Complementarities." American Sociological Review 71(6): 986-1013.
- Gangl, M., W. Müller, et al. (2003). Conclusions: Explaining Cross-National Differences in School-to-Work Transitions. Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets. W. Müller and M. Gangl. Oxford, Oxford University Press: 277-305.
- Gash, V. (2008). "Bridge or Trap? Temporary Workers' Transitions to Unemployment and to the Standard Employment Contract." European Sociological Review 24(5): 651-668.
- Gauthier, J.-A., E. D. Widmer, et al. (2009). "How Much Does It Cost? Optimization of Costs in Sequence Analysis of Social Science Data." Sociological Methods & Research 38(1): 197-231.
- Gauthier, J.-A., E. D. Widmer, et al. (2010). "Multichannel Sequence Analysis Applied to Social Science Data." Sociological Methodology 40(1): 1-38.
- Gebel, M. (2009). "Fixed-Term Contracts at Labour Market Entry in West Germany: Implications for Job Search and First Job Quality." European Sociological Review 25(6): 661-675.
- Goldthorpe, J. H. (2000). Current Issues in Comparative Macrosociology. On Sociology. Numbers, Narratives, and the Integration of Research and Theory. J. H. Goldthorpe. Oxford, Oxford University Press: 45-64.

- Goodin, R. E., Ed. (1996). The Theory of Institutional Design. Cambridge, Cambridge University Press.
- Gregg, P. (2001). "The Impact of Youth Unemployment on Adult Unemployment in the NCDS." Economic Journal **111**(475): 626-653.
- Groth, C. and W. Maenning, Eds. (2001). Strategies against Youth Unemployment: An International Comparison. Frankfurt/Main et al., Peter Lang.
- Hall, P. A. and D. Soskice (2001a). An Introduction to Varieties of Capitalism. Varieties of Capitalism. The Institutional Foundations of Comparative Advantage. P. E. Hall and D. Soskice. Oxford, Oxford University Press.
- Hall, P. A. and D. Soskice, Eds. (2001b). Varieties of Capitalism. The Institutional Foundations of Comparative Advantage. Oxford, Oxford University Press.
- Hall, P. A. and R. C. R. Taylor (1996). "Political Science and the Three New Institutionalisms." Political Studies **44**(5): 936-957.
- Halpin, B. and T. W. Chan (1998). "Class Careers as Sequences: An Optimal Matching Analysis of Work-Life Histories." European Sociological Review **14**(2): 111-130.
- Hammer, T. (1996). "Consequences of Unemployment in the Transition from Youth to Adulthood in a Life Course Perspective." Youth & Society **27**(4): 450-468.
- Hammer, T. (1997). "History Dependence in Youth Unemployment." European Sociological Review **13**(1): 17-33.
- Hammer, T., Ed. (2003). Youth Unemployment and Social Exclusion in Europe. A Comparative Study. Bristol, Policy Press.
- Hammer, T. (2007). "Labour Market Integration of Unemployed Youth from a Life Course Perspective: the Case of Norway." International Journal of Social Welfare **16**(3): 249-257.
- Heath, A. and S. Y. Cheung (1998). Education and Occupation in Britain. From School to Work. A comparative Study of Educational Qualifications and Occupational destinations. Y. Shavit and W. Müller. Oxford, Clarendon Press: 71-101.
- Hollister, M. (2009). "Is Optimal Matching Suboptimal?" Sociological Methods & Research **38**(2): 235-264.
- Honkapohja, S. and E. Koskela (1999). "The Economic Crisis of the 1990s in Finland." Economic Policy **14**(29): 399-436.
- Hout, M., A. E. Raftery, et al. (1993). Making the Grade. Educational Stratification in the United States, 1925-1989. Persistent Inequality. Changing Educational

- Attainment in Thirteen Countries. Y. Shavit and H.-P. Blossfeld. Boulder / San Francisco / Oxford, Westview Press: 25-49.
- Huang, Q., B. M. El-Khoury, et al. (2007). "Women's Career Patterns: A Study of Swedish Women Born in the 1950s." Journal of Occupational and Organizational Psychology **80**(3): 387-412.
- Inui, A. (2009). NEETs, Freeters and Flexibility. Handbook of Youth and Young Adulthood. New Perspectives and Agendas. A. Furlong. London / New York, Routledge: 176-181.
- Järvinen, T. and M. Vanttaja (2001). "Young People, Education and Work: Trends and Changes in Finland in the 1990s." Journal of Youth Studies **4**(2): 195-207.
- Johnson, W. R. (1978). "A Theory of Job Shopping." Quarterly Journal of Economics **92**(2): 261-278.
- Jones, F. (1998). The Transition from School to Work in Australia. From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations. Y. Shavit and W. Müller. Oxford, Clarendon Press: 49-70.
- Jovanovic, B. (1979). "Job Matching and the Theory of Turnover." Journal of Political Economy **87**(5): 972-990.
- Julkunen, I. (2010). Youth Unemployment and Marginalization. Handbook of Youth and Young Adulthood. New Perspectives and Agendas. A. Furlong. London / New York, Routledge: 157-166.
- Kerckhoff, A. C. (2000). Transition from School to Work in Comparative Perspective. Handbook of the Sociology of Education. M. T. Hallinan. New York, Kluwer Academic: 453-474.
- Kerckhoff, A. C. (2004). From Student to Worker. Handbook of the Life Course. J. T. Mortimer and M. J. Shanahan. New York, Springer: 251-267.
- Kieselbach, T., Ed. (2000). Youth Unemployment and Social Exclusion. A Comparison of Six European Countries. Opladen, Leske + Budrich.
- King, G., R. O. Keohane, et al., Eds. (1994). Designing Social Inquiry. Scientific Inference in Qualitative Research. Princeton, Princeton University Press.
- Kittel, B. (1999). "Sense and Sensitivity in Pooled analysis of Political Data." European Journal of Political Research **35**(2): 225-253.
- Kletzer, L. G. and R. W. Fairlie (2003). "The Long-Term Costs of Job Displacement for Young Adult Workers." Industrial and Labor Relations Review **56**(4): 682-698.
- Kogan, I. (2004). "Last Hired, First Fired? The Unemployment Dynamics of Male Immigrants in Germany." European Sociological Review **20**(5): 445-461.

- Kogan, I. (2007). "A Study of Immigrants' Employment Careers in West Germany Using the Sequence Analysis Technique." Social Science Research **36**: 491-511.
- Kohler, U. and C. Brzinsky-Fay (2005). "Stata Tip 25: Sequence Index Plots." Stata Journal **5**(4): 8-9.
- Korpi, T., P. de Graaf, et al. (2003). "Vocational Training and Career Employment Precariousness in Great Britain, the Netherlands and Sweden." Acta Sociologica **46**(1): 17-30.
- Kruskal, J. B. (1983). An Overview of Sequence Comparison. Time Warps, String Edits, and Macromolecules: The Theory and Practice of Sequence Comparison. D. Sankoff and J. B. Kruskal. Reading, Addison-Wesley: 1-44.
- Kvist, J. (2007). Exploring Diversity: Measuring Welfare State Change with Fuzzy-Set Methodology. Investigating Welfare State Change. The 'Dependent Variable Problem' in Comparative Analysis. J. Clasen and N. A. Siegel. Cheltenham / Northampton, Edward Elgar: 198-214.
- Layte, R., H. Levin, et al. (2000). Unemployment and Cumulative Disadvantage in the Labour Market. Welfare Regimes and the Experience of Unemployment in Europe. D. Gallie and S. Paugam. Oxford, Oxford University Press: 153-174.
- Levenshtein, V. I. (1966). "Binary Codes Capable of Correcting Deletion, Insertions and Reversals." Soviet Physics Doklady **10**: 707-710.
- Levine, J. H. (2000). "But What Have You done for Us Lately?" Sociological Methods & Research **29**(1): 34-40.
- Lieberson, S. (1991). "Small N's and Big Conclusions: An Examination of the Reasoning in Comparative Studies Based on a Small Number of Cases." Social Forces **70**(2): 307-320.
- Lijphart, A. (1975). "The Comparable Cases Strategy in Comparative Research." Comparative Political Studies **8**(2): 157-175.
- Lindbeck, A. and D. J. Snower (1989). The Insider-Outsider Theory of Employment and Unemployment. Cambridge, MIT Press.
- MacIndoe, H. and A. Abbott (2004). Sequence Analysis and Optimal Matching Techniques for Social Science Data. Handbook of Data Analysis. M. Hardy and A. Bryman. London / Thousand Oaks / New Dehli, Sage Publications: 387-406.
- Manski, C. F. (1993). Adolescent Econometricians: How Do Youth Infer the Returns to Schooling? Studies of Supply and Demand in Higher Education. C. T. Clotfelter and M. Rothschild. Chicago, University of Chicago Press: 43-60.

- March, J. G. and J. P. Olsen (2006). Elaborating the "New Institutionalism". The Oxford Handbook of Political Institutions. R. A. W. Rhodes, S. A. Binder and B. A. Rockman. Oxford, Oxford University Press. 2: 3-20.
- Marsden, D. (1990). Institutions and Labour Mobility: Occupational and Internal Labour Markets in Britain, France, Italy and West Germany. Labour Relations and Economic Performance. R. Brunetta and C. Dell'aringa. Basingstoke, MacMillan: 414-438.
- Marsden, D. (1999). A Theory of Employment Systems. Micro-Foundations of Societal Diversity. Oxford, Oxford University Press.
- Martin, P., I. Schoon, et al. (2008). "Beyond Transitions: Applying Optimal Matching Analysis to Life Course Research." International Journal of Social Research Methodology 11(3): 179-199.
- Maurice, M., F. Sellier, et al. (1986). The Social Foundations of Industrial Power. A Comparison of France and Germany. Cambridge / London, MIT Press.
- McVicar, D. and M. Anyadike-Danes (2002). "Predicting successful and unsuccessful transitions from school to work by using sequence methods." Journal of the Royal Statistical Society 165(2): 317-334.
- Mjøset, L. and T. H. Clausen, Eds. (2007). Capitalisms Compared. Comparative Social Research. Amsterdam et al., Elsevier.
- Mroz, T. A. and T. H. Savage (2006). "The Long-Term Effects of Youth Unemployment." Journal of Human Resources 41(2): 259-293.
- Müller, W. and M. Gangl, Eds. (2003). Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets. Oxford, Oxford University Press.
- Müller, W. and Y. Shavit (1998). The Institutional Embeddedness of the Stratification Process. From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations. Y. Shavit and W. Müller. Oxford, Oxford University Press: 1-48.
- Narendranathan, W. and P. Elias (1993). "Influences of Past History on the Incidence of Youth Unemployment: Empirical Findings for the UK." Oxford Bulletin of Economics and Statistics 55(2): 161-185.
- Needleman, S. P. and C. D. Wunsch (1970). "A general Method Applicable to the Search for Similarities in the Amino Acid Sequence of Two Proteins." Journal of Molecular Biology 48(3): 443-453.
- Nordström Skans, O. (2004). Scarring effects of the first labour market experience: A sibling based analysis. Uppsala, IFAU Working Paper.

- North, D. C. (1990). Institutions, Institutional Change and Economic Performance. Cambridge, Cambridge University Press.
- O'Reilly, J., I. Cebrián, et al., Eds. (2000). Working-Time Changes. Social Integration Through Transitional Labour Markets. Labour Markets and Employment Policy. Cheltenham / Northampton, Edward Elgar.
- OECD (2001). Knowledge and Skills for Life. First Results from the OECD Programme for International Student Assessment (PISA) 2000. Paris, OECD.
- OECD (2004a). Employment Outlook. Paris, OECD.
- OECD (2004b). Learning for Tomorrow's World. First Results from PISA 2003. Paris, OECD.
- OECD (2005). Education at a Glance 2005. OECD Indicators. Paris, OECD.
- OECD (2007). PISA 2006. Science Competencies for Tomorrow's World. Volume 1 - Analysis. Paris, OECD.
- OECD (2008a). Jobs for Youth. Norway. Paris, OECD.
- OECD (2008b). Jobs for Youth. United Kingdom. Paris, OECD.
- OECD (2009a). Jobs for Youth. Australia. Paris, OECD.
- OECD (2009b). Jobs for Youth. France. Paris, OECD.
- OECD (2009c). Jobs for Youth. United States. Paris, OECD.
- OECD (2010a). Jobs for Youth. Denmark. Paris, OECD.
- OECD (2010b). Off to a Good Start? Jobs for Youth. Paris, OECD.
- Østerlund, R. (1999). School-to-Work Transition in Denmark. International Perspectives on the School-to-Work Transition. D. Stern and D. A. Wagner. Cresskill, Hampton Press: 155-185.
- Peters, B. G. (1999). Institutional Theory in Political Science. The 'New Institutionalism'. London / New York, Continuum.
- Piccarreta, R. and F. C. Billari (2007). "Clustering Work and Family Trajectories By Using a Divisive Algorithm." Journal of the Royal Statistical Society **170**(4): 1061-1078.
- Pierson, P. (2000). "Increasing Returns, Path Dependence, and the Study of Politics." American Political Science Review **94**(2): 251-267.
- Pierson, P., Ed. (2001). The New Politics of the Welfare State. Oxford, Oxford University Press.

- Pollock, G. (2007). "Holistic Trajectories: a Study of combined Employment, Housing and Family Careers by Using Multiple-Sequence Analysis." Journal of the Royal Statistical Society **170**(1): 167-183.
- Pollock, G., V. Antcliff, et al. (2002). "Work Orders: Analysing Employment Histories Using Sequence Data." Social Research Methodology **5**(2): 90-105.
- Powell, W. W. and P. J. DiMaggio (1991). The New Institutionalism in Organizational Analysis. Chicago, University of Chicago Press.
- Pusser, B. and M. E. R. Lloyd (2010). USA. International Encyclopedia of Education. P. Peterson, E. Baker and B. McGraw. Oxford, Elsevier: 888-895.
- Quintini, G. and T. Manfredi (2009). Going Separate Ways? School-to-Work Transitions in the United States and Europe. Paris, OECD.
- Quintini, G., J. P. Martin, et al. (2007). The Changing Nature of the School-to-Work Transition Process in OECD Countries. Bonn, IZA Discussion Paper.
- Raffe, D. (2003). "Pathways Linking Education and Work: A Review of Concepts, Research, and Policy Debate." Journal of Youth Studies **6**(1): 3-19.
- Raffe, D. (2008). "The Concept of Transition System." Journal of Education and Work **21**(4): 277-296.
- Raffe, D. (2009). Explaining Cross-National Differences in Education-to-Work Transitions. Handbook of Youth and Young Adulthood. A. Furlong. London / New York, Routledge: 105-113.
- Raffe, D. (2010). Scotland. International Encyclopedia of Education. P. Peterson, E. Baker and B. McGraw. Oxford, Elsevier: 770-775.
- Raffe, D., A. Biggart, et al. (1998). Thematic Review of the Transition from Initial Education to Working Life. Paris, OECD.
- Ragin, C. C. (1987). The Comparative Method. Moving Beyond Qualitative and Quantitative Strategies. Berkeley / Los Angeles / London, California University Press.
- Ragin, C. C. (2000). Fuzzy-Set Social Science. Chicago, University of Chicago Press.
- Ragin, C. C., D. Berg-Schlosser, et al. (1996). Political Methodology: Qualitative Methods. The New Handbook of Political Science. R. E. Goodin and H.-D. Klingemann. Oxford, Oxford University Press: 749-768.
- Räisänen, H. and G. Schmid (2008). Transitional Labour Markets and Flexicurity from the Finnish Labour Market Point of View. Berlin, Wissenschaftszentrum Berlin.
- Rawls, J. (1990). A Theory of Justice. Oxford, Oxford University Press.

- Reich, M., Ed. (2008). Segmented Labor Markets and Labor Mobility. Cheltenham / Northampton, Edward Elgar.
- Rihoux, B. and C. C. Ragin, Eds. (2009). Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques. Applied Social Research Methods Series. Los Angeles / London / New Dehli / Singapore, Sage.
- Ritchie, J. (2000). "New Deal for Young People: Participants' Perspectives." Policy Studies **21**(4): 301-312.
- Rose, R. (1990). "Inheritance Before Choice in Public Policy." Journal of Theoretical Politics **2**(3): 263-291.
- Rueda, D. (2005). "Insider-Outsider-Politics in Industrialised Democracies: The challenge to Social Democratic Parties." American Political Science Review **99**(1): 61-74.
- Rueda, D. (2006). "Social Democracy and Active Labour-Market Policies: Insiders, Outsiders and the Politics of Employment Promotion." British Journal of Political Science **36**(3): 385-406.
- Ruhm, C. J. (1991). "Are Workers Permanently Scarred by Job Displacements?" American Economic Review **81**(1): 319-324.
- Russell, H. and P. O'Connell (2001). "Getting a Job in Europe: The Transition from Unemployment to Work among Young People in Nine European Countries." Work, Employment & Society **15**(1): 1-24.
- Saar, E., M. Unt, et al. (2008). "Transition from Educational System to Labour Market in the European Union. A Comparison between New and Old Members." International Journal of Comparative Sociology **49**(1): 31-59.
- Sackmann, R. and M. Wingens (2003). From Transitions to Trajectories. Sequence Types. Social Dynamics of the Life Course. Transitions, Institutions, and Interrelations. W. R. Heinz and V. W. Marshall. New York, Aldine de Gruyter: 93-115.
- Sahlberg, P. (2007). "Education Policies for Raising Student Learning: the Finnish Approach." Journal of Education Policy **22**(2): 147-171.
- Saint-Paul, G. (1996). "Exploring the Political Economy of Labour Market Institutions." Economic Policy **11**(23): 265-315.
- Saint-Paul, G. (2002). "The Political Economy of Employment Protection." The Journal of Political Economy **110**(3): 672-704.
- Salmela-Aro, K., N. Kiuru, et al. (2011). "Mapping Pathways to Adulthood among Finnish University Students: Sequences, Patterns, Variations in Family- and Work-Related Roles " Advances in Life Course Research **16**(1): 25-41.

- Scherer, S. (2001). "Early Career Patterns: A Comparison of Great Britain and West Germany." European Sociological Review 17(2): 119-144.
- Scherer, S. (2004). "Stepping-Stones or Traps? The Consequences of Labour Market Entry Positions on Future Careers in West Germany, Great Britain and Italy." Work, Employment and Society 18(2): 369-394.
- Schmid, G., J. O'Reilly, et al., Eds. (1996). International Handbook of Labour Market Policy and Evaluation. Cheltenham/Brookfield, Edward Elgar.
- Schmid, G., K. Schömann, et al. (1997). Evaluierung der Arbeitsmarktpolitik. Ein analytischer Bezugsrahmen am Beispiel des Arbeitsmarktpolitischen Rahmenprogramms in Berlin. Berlin, Wissenschaftszentrum Berlin für Sozialforschung (WZB).
- Schmidt, V. A. (2008). "Discursive Institutionalism: The Explanatory Power of Ideas and Discourse." Annual Review of Political Science 11: 303-326.
- Schmidt, V. A. (2010). "Taking Ideas and Discourse Seriously: Explaining Change Through Discursive Institutionalism as the 'Fourth Institutionalism'." European Political Science Review 2(1): 1-25.
- Schneider, C. Q. and C. Wagemann (2007). Qualitative Comparative Analysis (QCA) und Fuzzy Sets. Ein Lehrbuch für Anwender und jene, die es werden wollen. Opladen / Farmington Hills, Verlag Barbara Budrich.
- Schneider, C. Q. and C. Wagemann (2010). "Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy-Sets." Comparative Sociology 9(3): 397-418.
- Schoon, I., A. McCulloch, et al. (2001). "Transitions from School to Work in a Changing Social Context." Young - Nordic Journal of Youth Research 9(1): 4-22.
- Sellier, M. (2010). National Systems of Education - France. International Encyclopedia of Education (Volume 5). P. Peterson, E. Baker and B. McGaw. Amsterdam et al., Elsevier: 576-581.
- Shalev, M. (2007). Limits and Alternatives to Multiple Regression in Comparative Research. Capitalisms Compared. L. Mjøset and T. H. Clausen. Amsterdam et al., Elsevier: 261-308.
- Shanahan, M. J. (2000). "Pathways to Adulthood in Changing Societies: Variability and Mechanisms in Life Course Perspective." Annual Review of Sociology 26: 667-692.
- Shavit, Y. and H.-P. Blossfeld, Eds. (1993). Persistent Inequality. Changing Educational Attainment in Thirteen Countries. Boulder / San Francisco / Oxford, Westview Press.

- Shavit, Y. and W. Müller, Eds. (1998). From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations. Oxford, Clarendon Press.
- Shoval, N. and M. Isaacson (2007). "Sequence Alignment as a Method for Human Activity Analysis in Space and Time." Annals of the Association of American Geographers 97(2): 282-297.
- Simonson, J., L. Romeu Gordo, et al. (2011). "Changing Employment Patterns of Women in Germany: How do Baby Boomers Differ from Older Cohorts? A Comparison Using Sequence Analysis." Advances in Life Course Research 16(2): 65-82.
- Smyth, E., M. Gangl, et al. (2001). A Comparative Analysis of Transitions from Education to Work in Europe (CATEWE). Final Report. Dublin, ESRI.
- Solga, H. (2002). "Stigmatization by Negative Selection': Explaining Less-Educated People's Decreasing Employment Opportunities." European Sociological Review 18(2): 159-178.
- Spring, J. (1976). The Sorting Machine. New York, David McKay.
- Steijn, B., A. Need, et al. (2006). "Well Begun, Half Done? Long-Term Effects of Labour Market Entry in the Netherlands, 1950-2000." Work, Employment and Society 20(3): 453-472.
- Stern, D. and D. A. Wagner, Eds. (1999). International Perspectives on the School-to-Work transition. Cresskill, Hampton Press.
- Studer, M., G. Ritschard, et al. (2011). "Discrepancy of State Sequences." Sociological Methods & Research 40(3): 471-510.
- Sweet, R. (1999). An Overview of School-to-Work Arrangements in Australia. International Perspectives on the School-to-Work Transition. D. Stern and D. A. Wagner. Cresskill, Hampton Press: 69-124.
- Thelen, K. (2004). How Institutions Evolve. The Political Economy of Skills in Germany, Britain, the United States and Japan. Cambridge, Cambridge University Press.
- Traxler, F., S. Blaschke, et al. (2002). National Labour Relations in Internationalized Markets. A Comparative Study of Institutions, Change, and Performance. Oxford, Oxford University Press.
- Treiman, D. J. (1977). Occupational Prestige in Comparative Perspective. New York, Academic Press.
- Tuovinen, J. E. (2010). Finland. International Encyclopedia of Education. P. Peterson, E. Baker and B. McGraw. Oxford, Elsevier: 569-575.

- Turner, R. H. (1960). "Sponsored and Contest Mobility and the School System." American Sociological Review **25**(6): 855-867.
- van der Velden, R. and M. H. J. Wolbers (2003). The Integration of Young People into the Labour Market: the Role of Training Systems and Labour Market Regulation. Transitions from Education to Work in Europe: the Integration of Youth into EU Labour Markets. W. Müller and M. Gangl. Oxford/New York, Oxford University Press: 174-199.
- Veblen, T. (2007 [1899]). The Theory of the Leisure Class. Oxford, Oxford University Press.
- Viebrock, E. and J. Clasen (2009). "Flexicurity and Welfare Reform: a Review." Socio-Economic Review **7**(2): 305-331.
- Viscusi, W. K. (1980). "A Theory of Job Shopping. A Bayesian Perspective." Quarterly Journal of Economics **94**(3): 609-614.
- Walther, A. and B. Stauber, Eds. (2002). Misleading Trajectories. Integration Policies for Young Adults in Europe? Opladen, Leske + Budrich.
- Whatford, C. (2010). England. International Encyclopedia of Education. P. Peterson, E. Baker and B. McGraw. Oxford, Elsevier: 550-554.
- Wiggins, R. D., C. Erzberger, et al. (2007). "Optimal Matching Analysis Using Ideal Types to Describe the Lifecourse: An Illustration of How Histories of Work, Partnerships and Housing Relate to Quality of Life in Early Old Age." International Journal of Social Research Methodology **10**(4): 259-278.
- Wu, L. L. (2000). "Some Comments on "Sequence Analysis and Optimal Matching Methods in Sociology: Review and Prospect"." Sociological Methods & Research **29**(1): 41-64.
- Zeitlin, J. and P. Pochet (2005). The Open Method of Co-ordination in Action. The European Employment and Social Inclusion Strategies. Brussels et al., P.I.E. Peter Lang.

Sequence analysis with Stata

Christian Brzinsky-Fay
Wissenschaftszentrum Berlin
Berlin, Germany
brzinsky-fay@wz-berlin.de

Ulrich Kohler
Wissenschaftszentrum Berlin
Berlin, Germany
kohler@wz-berlin.de

Magdalena Luniak
Wissenschaftszentrum Berlin
Berlin, Germany
luniak@wz-berlin.de

Abstract. We describe a general strategy to analyze sequence data and introduce SQ-Ados, a bundle of Stata programs implementing the proposed strategy. The programs include several tools for describing and visualizing sequences as well as a Mata library to perform optimal matching using the Needleman–Wunsch algorithm. With these programs Stata becomes the first statistical package to offer a complete set of tools for sequence analysis.

Keywords: st0111, sqclusterdat, sqclustermat, sqdes, sqindexplot, sqom, sqpar-coord, sqset, sqstatlist, sqstatsum, sqstatlab1, sqstatlab2, sqstatlabsum, sqtab, sequence analysis, optimal matching, cluster analysis, panel data, longitudinal data, explorative data analysis, sequence index plot

1 Introduction

Sequence data arise in many scientific fields, such as biology, where DNA sequences constitute the basic foundation of life, and the social sciences, where researchers investigate life courses, marital histories, and employment profiles. A sequence is defined as an ordered list of elements, where an element can be a certain status (e.g., employment or marital status), a physical object (e.g., base pair of DNA, protein, or enzyme), or an event (e.g., a dance step or bird call). The positions of the elements are fixed and ordered by elapsed time or by another more or less natural order (see figure 1).

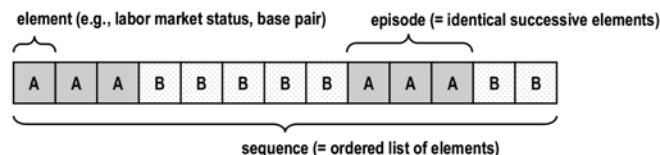


Figure 1: Sample sequence

Sequence data share some of the properties of cross-sectional time-series and survival data. However, unlike the former, the positions in a sequence refer to a relative, not an absolute, time point. Moreover, sequences are generally seen as an entity of their own,

and the interest is in the sequential character of all elements together. Unlike survival data, they do not involve a hazard or censoring.

Including the sequential information in the research design increases the complexity of the analysis because the number of possible sequences grows exponentially with the sequence length. For example, with three elements and a sequence length of 36, one can form $3^{36} = 1.5 \times 10^{17}$ sequences. Dealing with sequence data therefore raises two questions: how can the sequential character of the data be maintained without reducing it to single events, and how can the variation in the sequences be optimally reduced. The strategy proposed here to analyze sequence data involves five steps:

1. *description*, i.e., tabulation of sequences and calculation of indicators for the characteristics of each sequence;
2. *visualization* with sequence index plots or parallel-coordinates plots;
3. *comparison* using distance measures obtained via optimal matching (OM);
4. *grouping* of “similar sequences”, based on the results of the comparison step using techniques like cluster analysis or multidimensional scaling; and
5. *application* by using the grouped sequences as dependent or independent variables in standard regression models or other confirmatory analyses.

Here we will describe steps 1–4 in more detail. Step 5 is omitted because it involves only standard statistical techniques such as cross-tabulation and regression models. As we proceed, we will introduce a bundle of user-written Stata commands for sequence analysis (“SQ-Ados”) that make Stata the first general statistical package to offer tools for all steps of sequence analysis.¹ Because of space constraints, we cannot describe each command in detail here. We refer readers to the help files of the respective commands for a full description of the options. An introduction to the commands can also be found in `help sq`, and a software demonstration is provided in `help sqdemo`.

2 Preliminaries

We will use artificial data on the employment status of 500 graduates over a period of up to 36 months after leaving high school. The data resemble a cross-sectional time-series dataset like the British Household Panel Study, <http://www.iser.essex.ac.uk/ulsc/bhps/>, or the German Socio-Economic Panel, <http://www.diw.de/english/sop/>. The listing below shows the *positions* 1–10 of the respondent with *id* 43. The sequence starts with the

1. The freeware program TDA (<http://www.stat.ruhr-uni-bochum.de/tda.html>) performs OM and calculates many descriptive statistics, but it lacks easily accessible visualization features and cluster analysis tools. SAS produces sequence index plots with the help of a user-written program (Scherer 2001) but does not perform OM itself. “Optimize” by Andrew Abbott (<http://home.uchicago.edu/~aabbott/om.html>) performs OM and several graphical displays for some sequences. Finally, a variety of specialized biological sequencing programs for OM exist that tend to be optimized for small numbers of long sequences.

element 3 (i.e., employment), changes to vocational education, and ends with inactivity at the 10th position.

```
. use youthemp, clear
(youth sequences: 36 months, wide)
. list st1-st10 if id == 43, nlabel
```

	st1	st2	st3	st4	st5	st6	st7	st8	st9	st10
43.	3	3	3	2	2	2	2	2	5	5

```
. label list lbstat
lbstat:
      1 higher education
      2 vocational education
      3 employment
      4 unemployment
      5 inactivity
```

The example sequence data are in wide form, but before the commands for sequence analysis can be used, the data need to be in long form and must be **sqset**. The former can easily be accomplished with the official Stata command [D] **reshape**:

```
. reshape long st, i(id) j(order)
(output omitted)
```

The **sqset** command serves a similar function to **tsset** (see [TS] **tsset**) and **stset** (see [ST] **stset**) for cross-section time-series and survival time analysis, respectively. It is used to declare the variable that holds the elements of a sequence, the variable that holds the order of the elements, and the variable that uniquely identifies each sequence. Its syntax diagram is

```
sqset elementvar idvar ordervar [, clear [ltrim|rtrim|trim] keeplongest]
```

where *elementvar* is the name of the variable that contains the elements, *idvar* is the sequence identifier, and *ordervar* is the variable that defines the order of a sequence. The standard use of **sqset** requires no options, which is sufficient for our example here. The available options can be used if there are incomplete sequences; **sqset** checks for the type of incompleteness and suggests the proper option. Often sequences derived from unbalanced panels contain missing values at the beginning or the end of the sequence. The option **ltrim** cuts off the missing values at the beginning by aligning all sequences to the first position. The option **rtrim** deletes the missing values at the end of a sequence, and **trim** does both. Finally, the option **keeplongest** is used to keep only the longest contiguous part of each sequence. Read **help sqset** carefully and the respective section in **help sq** before using **keeplongest**.

```
. sqset st id order
      element variable:  st, 1 to 5
      identifier variable: id, 1 to 500
      order variable:   order, 1 to 36
```



```
. sqtab, ranks(1/10)
```

[illegible]

```
. sqtab, ranks(1/10) so
```

Sequence-Order	Freq.	Percent	Cum.
4	38	16.45	16.45
3	28	12.12	28.57
43	28	12.12	40.69
51	28	12.12	52.81
5	18	7.79	60.61
41	17	7.36	67.97
4343	13	5.63	73.59
45	11	4.76	78.35
31	10	4.33	82.68
313	10	4.33	87.01
32	10	4.33	91.34
323	10	4.33	95.67
53	10	4.33	100.00
Total	231	100.00	

3. An application of the two similarity definitions from political sociology can be found in [Kohler \(2002\)](#).

```
. sqtab, ranks(1/10) se
```

Sequence-El ements	Freq.	Percent	Cum.
34	68	17.85	17.85
134	42	11.02	28.87
345	38	9.97	38.85
4	38	9.97	48.82
13	36	9.45	58.27
15	31	8.14	66.40
23	29	7.61	74.02
3	28	7.35	81.36
45	27	7.09	88.45
135	22	5.77	94.23
14	22	5.77	100.00
Total	381	100.00	

The `gapinclude` option is used to include sequences with gaps in the tabulation. By default, all SQ-Ados exclude sequences with gaps, although this is required only for the OM algorithm and otherwise can be overridden with the `gapinclude` option. Other ways of dealing with broken sequences are described in `help sq`.

Finally, if an optional variable name is specified, a cross tabulation of the sequences with the specified variable will be displayed.

3.2 Concentration of sequences

Tabulating sequences is connected to the concept of concentration. In the tabulation on page 439, the most frequent sequence is shared by 38 of the 500 respondents. In the limiting cases when all (no) respondents share the same sequence, there is a high (low) concentration of sequences. Hence, the concentration is lower when there are more unique sequences.

The `sqdes` command provides information about the concentration or diversification of sequences. Its syntax diagram is

```
sqdes [if] [in] [, so se graph gapinclude]
```

where `so` and `se` refer to the similarity concepts described in section 3.1. The `graph` option is used to display a graphical representation of the output.

```
. sqdes
# of observed sequences: 500
overall # of obs. elements: 5
    max sequence length: 36
# of producible sequences: 1.455e+25
```

Observations	Sequences	% of observed	Cum.
1	309	61.8	61.8
2	22	4.4	66.2
3	5	1	67.2
4	3	.6	67.8
5	2	.4	68.2
7	1	.2	68.4
9	1	.2	68.6
10	1	.2	68.8
18	1	.2	69
28	1	.2	69.2
38	1	.2	69.4
Total	347	69.4	

In its header, the output of `sqdes` shows that we have observed 500 sequences. Among these 500 sequences, we have observed five different elements and up to 36 positions, implying $5^{36} = 1.455 \times 10^{25}$ theoretically producible sequences.

Among the 500 observed sequences there are only 347 *different* sequences. This number is shown in the last row of the table in the output of `sqdes`. In the limiting case when all observed sequences were unique (no concentration), the division of the number of different sequences by the number of observed sequences would be 1, whereby this number would converge to zero when all observed sequences were equal (high concentration). Here this measure of concentration is 69.4%.

The remaining numbers shown in the table are a breakdown of these overall concentration measures. Three hundred nine of the 347 observed sequences are unique (61.8% of the 500 observed sequences); 22 further sequences (4.4%) are shared by two persons, etc.

3.3 Sequence-specific descriptions

The SQ-Ados provide ways of describing important characteristics of observed sequences. Examples of such characteristics include the length of the sequences, the number of elements in each sequence, and the number of status changes in the sequence. Several such quantities can be stored as a variable in the dataset by using a bundle of `egen` functions (see `help sqegen`). A second bundle of commands are used to describe these e-generated variables (see `help sqstat`).

The syntax of the `egen` functions follows the standard syntax; see [D] `egen`. The following functions are available:

`sqelemcount()` [*, _element(#)* *gapinclude*] generates a variable holding the number of different elements in each sequence. The *gapinclude* option generates these counts for sequences with gaps, treating gaps as just another element.

`sqepicount()` [*, _element(#)* *gapinclude*] separates a sequence into sections of equal elements (called *episodes*) and generates a variable holding the number of episodes for each sequence. The number of episode changes can be calculated by subtracting one from the number of episodes. The *element()* option can be used to restrict the episode count to the specified elements.

`sqlength()` [*, _element(#)* *gapinclude*] generates a variable holding the length of each observed sequence, and the *element()* option can be used as above.

`sqgapcount()` generates a variable holding the number of gap episodes in each sequence.

`sqgaplength()` generates a variable holding the overall length of gap episodes in each sequence.

Examples of the *egen* functions are given below. Unlike common uses of *egen*, nothing is required inside the parentheses because the functions use the declarations provided with *sqset*:

```
. egen length = sqlength()
. egen length1 = sqlength(), element(1)
. egen elemnum = sqelemcount()
. egen epinum = sqepicount()
```

When using the variables generated with the *sq-egen* functions, keep in mind that the data are in long form, whereas the new variables refer to the sequences as entities. To further describe the variables, one can reshape the data back to wide format. However, a more convenient way to describe the new variables is provided by the *sqstat* commands, which summarize, tabulate, and list the variables generated with the *sq-egen* functions as if the data were in wide format, and the names of the variables generated by *sq-egen* are automatically processed.

The following *sqstat* commands are available:

sqstatlist [*varlist*] [*if*] [*in*] [*, ranks(numlist) replace list_options*], if given without *varlist*, lists all variables generated by the *sq-egen* bundle. With a *varlist* only the specified variables are listed. The option *ranks(numlist)* restricts the listing to the most frequent sequences, whereas *replace* keeps the listed data as a dataset in memory.

sqstatsum [*varlist*] [*if*] [*in*] [*, summarize_options*], if given without *varlist*, summarizes all variables generated by the *sq-egen* bundle. With *varlist*, only the specified variables are summarized.

sqstattab1 [*varlist*] [*if*] [*in*] [*, tab1_options*], if given without *varlist*, produces one-way frequency tables of all variables generated by the *sq-egen* bundle. With *varlist*, only the specified variables are used.

`sqstattab2 varname1 [varname2] [if] [in] [, tab2_options]`, if given without `varname2`, displays a two-way table of `varname1` against all variables generated by the `sq-egen` bundle. If specified with `varname2`, a two-way table of the two specified variables is displayed.

`sqstattabsum varname1 [varname2] [if] [in] [, format(%fmt) tabsum_options]` summarizes all e-generated variables for categories of the specified variables.

Here are some examples, which assume that the above `egen` commands have been executed. A further description of the `sqstat` commands can be found in `help sqstat`:

```
. sqstatsum
```

Variable	Obs	Mean	Std. Dev.	Min	Max
length	500	36	0	36	36
length1	500	7.44	11.14481	0	35
elemnum	500	2.244	.8329776	1	5
epinum	500	3.122	1.843343	1	12

We have 500 sequences, each with a length of 36, which also implies that the mean is 36. Some of the sequences contain the element 1 (education), and there is at least one sequence where 35 positions contain this element. On average only seven positions are occupied by education, however. The number of elements in all sequences is at least 1, and there are some sequences that contain all five possible elements. The maximum number of episodes is even higher, implying that some sequences oscillate between elements.

```
. sqstattab1 elemnum
-> tabulation of elemnum
```

Number of different elements in sequence	Freq.	Percent	Cum.
1	88	17.60	17.60
2	238	47.60	65.20
3	141	28.20	93.40
4	30	6.00	99.40
5	3	0.60	100.00
Total	500	100.00	

Only three sequences consist of all five elements, and 238 of the 500 sequences consist of only two elements, implying that some elements typically do not appear together, although more analysis is necessary to verify this claim.

(Continued on next page)

```
. sqstatabsum sex
```

sex	Summary of Length of sequence		
	Mean	Std. Dev.	Freq.
male	36	0	256
female	36	0	244
Total	36	0	500
sex	Summary of Length of episodes of element 1		
	Mean	Std. Dev.	Freq.
male	7	11	256
female	7	11	244
Total	7	11	500
sex	Summary of Number of different elements in sequence		
	Mean	Std. Dev.	Freq.
male	2	1	256
female	2	1	244
Total	2	1	500
sex	Summary of Number of episodes		
	Mean	Std. Dev.	Freq.
male	3	2	256
female	3	2	244
Total	3	2	500

Here the output reveals that the sequences do not vary with sex.

4 Visualization

A graphical representation is advisable in the usual case where the sequences are complex. An often-used technique to visualize sequence data is the so-called sequence index plot (Scherer 2001; Kogan 2003; Brüderl and Scherer 2004; Brzinsky-Fay 2006). Parallel-coordinates plots are an alternative that is used less often (Kohler 2002). The SQ-Ados contain commands for both kinds of plots.

4.1 Sequence index plots

Sequence index plots were proposed by Scherer (2001). The idea is to draw a horizontal line for each sequence, separating the elements with different colors. As shown in a previous publication (Kohler and Brzinsky-Fay 2005), such plots can be easily produced with `graph twoway hbar` or `graph twoway hline`. The command `sqindexplot` implements and further extends the idea by using the following syntax:

```
sqindexplot [if] [in] [, ranks(numlist) se so order(varname) by(varname)
            color(colorstyle) gapinclude twoway_options]
```

A simple application of

```
. sqindexplot
```

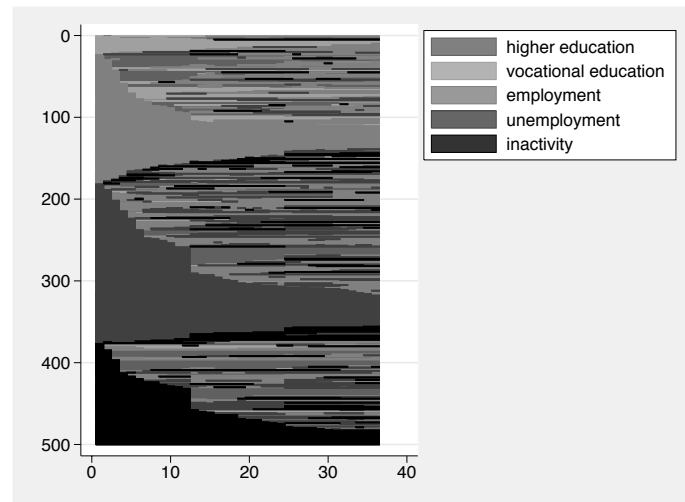


Figure 2: Sequence index plot

produces the graph shown in figure 2, which is far from optimal. To fine-tune the graph, `sqindexplot` allows all options that are available for `graph twoway`. When applying these options, consider several points:

- In general, color versions of sequence index plots are more sensible than black-and-white versions. The `color()` option allows fine-tuning of the colors used for the elements.
- With many observations, there is a tendency to overplot the lines, which has the effect of overrepresenting elements with higher category values (levels). The effect depends on the printer and/or screen resolution and can be adjusted by tuning the aspect ratio (see Cox 2004). It might also be sensible to restrict the graph to the most frequent sequences with the `ranks()` option or to plot groups of sequences separately with standard graphic options, e.g., `by(varname, yrescale)`.
- Sequence index plots depend heavily on the order of the sequences along the vertical axis. Without further options, a naive algorithm is used to order the sequences; however, the `order()` option sorts the sequences according to a user-defined variable. It is sensible to use the results of the comparison step (section 5) or the grouping step (section 6) to order the sequences in a sequence index plot.

Besides the standard form, `sqindexplot` produces similar plots after applying the “same order” or “same elements” similarity (section 3.1). The respective options are `so` and `se`.

4.2 Parallel-coordinates plots

Parallel-coordinates plots can easily be produced by Stata’s official `graph twoway line` command and are also implemented as statistical graphs (see [XT] `xtline`). In their standard form, these plots are especially helpful for cross-sectional time-series data of continuous variables (see the examples in Diggle, Liang, and Zeger [1994, 12]). With sequence data, the variables used for the vertical axis are usually categorical (the elements), and there is normally no relationship between the position in the sequence and the element at that position. Consequently, standard parallel-coordinates plots become unreadable for even moderate numbers of sequences, which is why they are seldom used as a graphical device for sequence data outside teaching. However, they can reveal valuable information.

To our knowledge, the only application of parallel-coordinates plots for many sequences is in Kohler (2002), which `sqparcoord` builds on. The basic idea of the program is to add optical effects to highlight frequent sequences and distinguish the lines from different sequences. Its syntax is

```
sqparcoord [if] [in] [, ranks(numlist) so offset(#) wlines(#)  
           gapinclude twoway_options]
```

where `ranks(numlist)` and `so` have the same meaning as for the sequence index plot.⁴

Figure 3 shows an example using the `wlines()` option and plots the elements of sequences along the vertical axis and the position (e.g., time points) along the horizontal axis. The sequences are drawn with a line that connects the elements in position order. The `wlines()` option draws thicker lines for frequent sequences, where the number in parentheses controls the weighting factor. Generally, the thicker the line, the more frequent the sequence. In our example, the graph shows that the “only unemployment” sequence is the most frequent sequence, followed by “only employment” and “only inactivity”. The dense (dark) region of the graph shows that changes between employment and unemployment are frequent over the whole period, whereas changes between education and other elements decrease slightly over time.

4. “Same elements” similarity is not applicable for parallel-coordinates plots.

```
. sqparcoord, ylabel(1(1)5, valuelabel angle(0)) wlines(2)
```

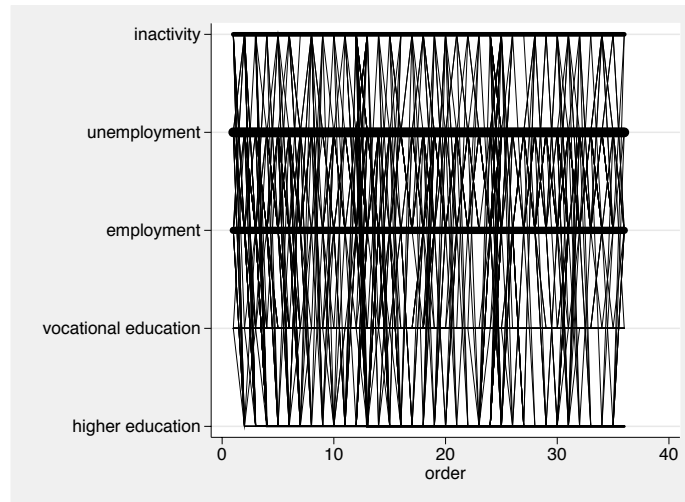


Figure 3: Parallel-coordinates plot with `wlines()`

Figure 4 shows an example of the `offset()` option, combined with `so`, `ranks()`, and `wlines()`. The figure was drawn with the following command:

```
. sqparcoord, so ranks(1/10) offset(.5) wlines(1)
> ylabel(1(1)5, valuelabel angle(0))
```

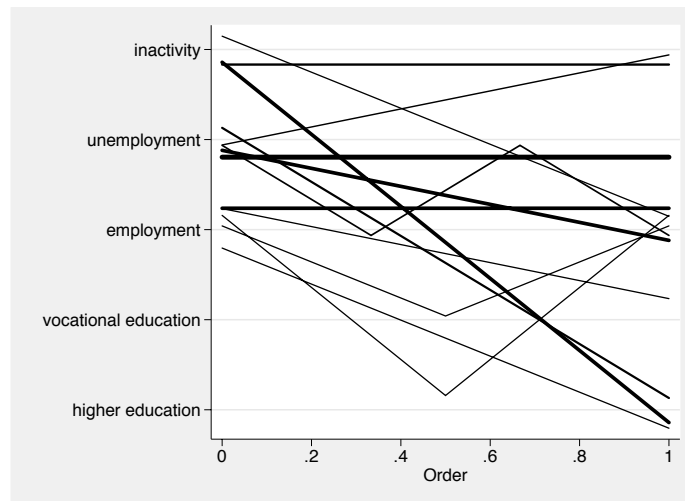


Figure 4: Parallel-coordinates plot with `offset()`, `ranks()`, and `wlines()`

With `offset()`, the lines for each sequence are slightly displaced along the vertical axis, where the number in parentheses controls the amount of displacement. This arrangement makes following the path of the individual sequences easier, which is especially useful for plots with just a few sequences. The plot reveals, among other things, that many of the most frequent sequences end up in employment or higher education.

5 Comparison

In the comparison step, one has to determine how sequences should be compared and how the difference between two sequences should be measured. For this step, the so-called Levenshtein distance is used, a measure from information technology that basically counts the number of operations needed to transform one string into another (Levenshtein 1966). It has been applied to various fields such as plagiarism detection, analysis of DNA sequences (Needleman and Wunsch 1970), ritual dances (Abbott and Forrest 1986), and the succession of lynchings in southern states of the United States (Stovel 2001). We informally introduce the idea of the Levenshtein distance and then go on to explain the functionality of our Stata implementation. A formal description of the computations necessary to derive the Levenshtein distance is given in section 7.1. More information can be found in Sankoff and Kruskal (1983), Waterman (1995), and Rohwer and Pötter (2005, sec. 6.7.2).

5.1 OM

Assume that we observe the following sequences of length 12 for two people, where each element refers to an employment status in a specific month after an arbitrary starting point:

Individual 1	ed	ed	ed	em	em	ue	ue	em	em	em	em	em
Individual 2	ed	ed	em	em	em	em	ue	ue	ue	ue	em	em

Individual 1 spent 3 months in education, after which he or she was employed for 2 months, then unemployed for another 2 months, and finally landed a job for the last 5 months. Individual 2 was in education for 2 months, then employed for 4 months, followed by an unemployment period of 4 months, and then employed again. A simple measure for the distance between these two sequences can be constructed by aligning both sequences and using a penalty, s , whenever the elements at a specific position differ:

ed	ed	ed	em	em	ue	ue	em	em	em	em	em
ed	ed	em	em	em	em	ue	ue	ue	ue	em	em
0	0	s	0	0	s	0	s	s	s	0	0

For an overall distance measure, one could multiply s by the number of differences. Such a measure largely follows the idea of traditional distance measures, such as the

Euclidean distance, but is *not* used for sequence analysis. The idea of the penalty is, however, important, and we will speak of substitution costs for this penalty. One could use different substitution costs for different combinations of discrepant elements.

The reason why this distance measure is not used in sequence analysis can be illustrated using two example sequences. From a visual inspection, one gets the impression that there is some similarity between the sequences that this distance measure neglects. Both sequences show the same succession of episodes; i.e., they begin with education, then have a short employment episode, followed by a short unemployment episode, and finally are employed again. The sequences differ only in episode duration.

To cope with this kind of order similarity, consider the following alignment of the two sequences:

ed	ed	ed	em	em			ue	ue			em	em	em	em	em
ed	ed		em	em	em	em	ue	ue	ue	ue	em	em			
0	0	d	0	0	d	d	0	0	d	d	0	0	d	d	d

Here we have shifted some episodes of both sequences to the right; i.e., we have inserted gaps. Below the alignment we have used 0 if the aligned elements are equal and d if we have inserted a gap. The distance between the two sequences depends on the number of insertions and on the value of d , which we will refer to as the *indel-cost*.⁵

Now consider the following example, where we have not changed the sequences but aligned them differently by shifting the end of the second sequence to the left:

ed	ed	ed	em	em			ue	ue			em	em	em	em	em
ed	ed	em	em	em	em	ue	ue	ue	ue	em	em				
0	0	s	0	0	d	0	0	d	d	0	0	d	d	d	

Here we have not inserted further gaps in our alignment. Instead, we have accepted that the elements at the third position are different, which is reflected by the substitution cost on the bottom line. We can calculate the overall distance by summing the terms on the bottom line. The overall distance increases with the number of substitutions and insertions and with the respective substitution and indel costs.

So far, the distance measure between two sequences is straightforward. We simply align two sequences in some way, count the number of substitutions and indels, weigh them with the respective costs, and add them all up, which heuristically defines the Levenshtein distance.

The problematic aspect of this definition is the alignment of the sequences, because we are free to insert gaps, delete positions, or accept differences. Thus there is more than one possible alignment of the two sequences, raising the question of which alignment to choose. The answer is to choose the alignment with the minimum distance, which

⁵. *Indel* is a combination of *insertion* and *deletion*. The term is used because one can derive the same distance measure by deleting certain positions from one sequence instead of inserting gaps.

is found via the Needleman–Wunsch algorithm ([Needleman and Wunsch 1970](#)) in the SQ-Ados; see section [7.1](#) for details.

Remember the double role of substitution and indel costs in the application of OM. On the one hand, they are terms in the definition of the distance measure; on the other hand, they play a role in the selection of the optimal alignment. It is therefore necessary to define these costs carefully, keeping two considerations in mind.

The first is that there can be good reason to differentiate substitution costs by element combinations. Some researchers refuse to differentiate substitution costs because of lack of theory ([Dijkstra and Taris 1995](#)), but often there are striking reasons for differentiation. In general, substitution costs should decline as elements become more similar. Some have proposed that substitution costs should be differentiated empirically by computing them from the category-to-category transition rates in the sequences ([Rohwer and Pötter 2005](#), sec. 6.7.2.5), meaning that less frequent transitions would be more costly than more frequent ones.

The second consideration is the relation between indel and substitution cost. Each substitution can be seen as a combination of one insertion and one deletion (i.e., an insertion in one sequence, followed by a deletion in the other). It is therefore sensible to set substitution costs to double the indel costs. For varying substitution costs, experience with OM has shown that using indel costs that are more than half the highest substitution costs prevents the algorithm from using indel operations, except to set off the difference in sequence length ([Macindoe and Abbott 2004](#), 349). If the position of an element within a sequence is important, one should define the indel costs to be at least half as much as the highest substitution cost. On the other hand, if only the relative position of episodes is important, then one should allow the algorithm to use indel operations for that purpose. Here it seems appropriate to establish indel costs at around 1/10 the largest substitution cost ([Macindoe and Abbott 2004](#), 349).

Finally, if sequences of different length are used, the distance measure will be heavily influenced by the disparity in sequence length because the potential distance between a short and a long sequence is higher than for those of equal length. To avoid this problem, the distance measures have to be standardized by dividing the calculated value by the length of either the sequence with the longer distance or the longest sequence in the dataset.

5.2 The sqom command

SQ-Ados contain the command `sqom` to perform OM. Its syntax diagram is

```
sqom [ if ] [ in ] [ , indelcost(#) subcost(# | rawdistance | mat_exp | matname)
      name(varname) refseqid(spec) full k(#)
      standard(# | cut | longer | longest | none) ]
```

Summary of options

`indelcost(#)` specifies the cost associated with an insertion or deletion in an alignment. The default is `indelcost(1)`.

`subcost(# | rawdistance | mat_exp | matname)` specifies the cost associated with a substitution in an alignment. The default is two times the value specified as the indel cost. Substitution costs may be specified as a number, as an implied formula, or as a full-substitution matrix. Specifying `subcost(3)` will assign a cost of 3 to any substitution in an alignment, regardless of how similar the substituted values may be. `subcost(rawdistance)` will use the absolute value of the difference between the two substituted values. A full substitution cost matrix can be created either by specifying the name of a matrix containing the substitution cost or by typing a valid matrix. Such a matrix must be a symmetric $p \times p$ matrix, where p is the number of different elements in all sequences. Specifying a full-substitution cost matrix can increase the running time of the program considerably. The `k()` option might be considered for `sqom` when you are using a full-substitution cost matrix.

`name(varname)` is used to specify the name of the variable that stores the distances. If not specified, `_SQdist` will be used and will be overwritten without warning whenever a `sqom` command without option `full` is invoked.

`refseqid(spec)` is used to select the reference sequence against which all sequences in the dataset are tested. An existing value of the sequence identifier must be specified in the parentheses. By default, the most frequent sequence is used.

`full` is used to perform OM for all sequences in the dataset against all others. The results of these comparisons are stored in the distance matrix “SQdist”. Specifying the `full` option will increase the running time of the program considerably.

`k(#)` might be used for `sqom` with `full`, which is used to speed up the calculation of the OM algorithm.⁶ A positive integer between 1 and the number of positions of the longest sequence can be given in the parentheses. The increase in speed will be higher with small numbers, but using small numbers can cause the algorithm to miss the optimal alignment between some sequences, especially if substitution costs are high relative to indel costs. See section 7.2 for more information on this option.

6. The implementation of the option `k()` is based partly on the source code of TDA, written by Götz Rohwer and Ulrich Pötter. TDA is a powerful program for transitory data analysis. It is programmed in C and distributed as freeware under the terms of the General Public License. It is downloadable from <http://www.stat.ruhr-uni-bochum.de/tda.html>.

`standard(#|cut|longer|longest|none)` is used to define the standardization of the resulting distances. With `standard(#)` all sequences are cut to the length `#`. `standard(cut)` automatically cuts all sequences to the length of the shortest sequence in the dataset. `standard(longer)` divides all distances by the length of the longer sequence of the respective alignment. `standard(longest)` divides all distances by the length of the longest sequence in the dataset, which is the default. `standard(none)` is specified if no standardization is needed.

Examples

Without more options, `sqom` performs OM between each sequence and the most frequent sequence in the dataset, setting the indel costs to 1 and the substitution costs to 2. It standardizes the distances by dividing each distance by the length of the longest sequence in the dataset.

The results of the comparisons are written into the newly generated variable `_SQdist`, which can be used for further analysis, such as ordering a sequence index plot.

```
. sqom
Distance Variable saved as _SQdist
```

However, since many of the sequences are equidistant to the reference sequence, one may want to combine the variable with a second sorting variable. For figure 5 we have combined the distance with variables containing the length of each element (see section 3.3):

```
. egen length2 = sqlength(), element(2)
. egen length3 = sqlength(), element(3)
. egen length4 = sqlength(), element(4)
. egen length5 = sqlength(), element(5)
. egen plotorder = group(_SQdist length1 length2 length5 length3 length4)
. sqindexplot, order(plotorder)
```

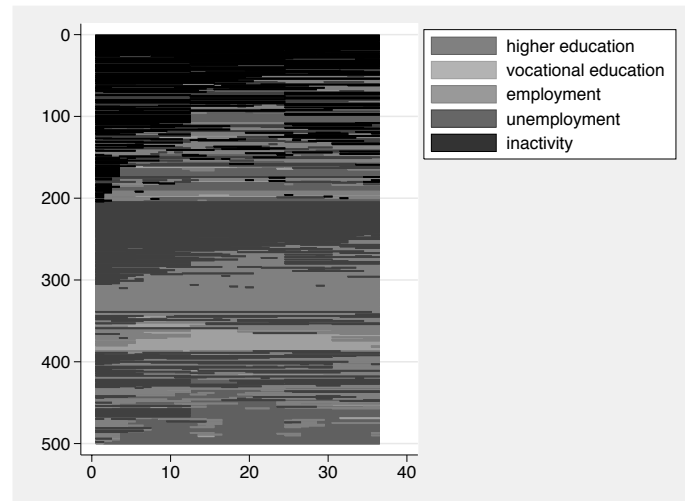


Figure 5: Sequence index plot with order from OM

In our next example, we use a full-substitution cost matrix, which was defined beforehand with standard matrix commands ([P] **matrix define**). Since the sequences in the data contain up to five elements, the subcost matrix needs to be a 5×5 symmetric matrix, where the first row/column refers to the element with the lowest category value. The name of the subcost matrix is inserted into the **subcost()** option. In addition to specifying a subcost matrix, we have also used the **refseq(15)** option, meaning that all sequences are compared against the sequence with **id==15** instead of the most frequent one. The results are written to the new variable, **om1**.

```
. matrix sub = 0,2,3,2,4 \
>          2,0,1,1,5 \
>          3,1,0,1,0 \
>          2,1,1,0,2 \
>          4,5,0,2,0
. sqom, subcost(sub) name(om1) refseq(15)
Distance Variable saved as om1
```

The running time of our second example increased because of the specification of the subcost matrix but can be reduced by applying the **k()** option. In our next example, we use almost the lowest possible value, **k(2)**, which does no harm in this case; i.e., the results are equal to the exact solution. However, there is no guarantee that this will always be the case.

```
. sqom, subcost(sub) name(om2) refseq(15) k(2)
Distance Variable saved as om2
. summarize om1 om2
```

Variable	Obs	Mean	Std. Dev.	Min	Max
om1	18000	.7437778	.5602692	0	1.972222
om2	18000	.7437778	.5602692	0	1.972222

Finally, we show an example with the **full** option, which requests that every possible comparison be calculated. With 500 observed sequences in the dataset, 124,750 distances need to be calculated. To reduce this enormous task, **sqom** performs the calculations only for the 347 *different* sequences, which still requires that 60,031 distances be calculated. Because computation time increases quadratically with the sequence length and the number of observations, you should expect long running times when specifying **full** with large datasets. For the following example, our computer (Pentium 4 with 2.66 GHz, Stata 9.2 for Linux) needed around 1 minute.

```
. sqom, k(2) full standard(longer)
Perform 60031 Comparisons with Needleman-Wunsch Algorithm
Distance matrix saved as SQdist
```

Naturally, the results of **sqom** with **full** cannot be stored as a variable in the existing dataset. It is therefore stored in the Stata matrix **SQdist**, which can be further processed by standard Stata commands and some specialized SQ-Ados (see section 6). Matrices are not stored with the dataset. The user-written command **mstore** by Michael Blasnik can be used for this task, however.

6 Grouping

On the basis of the distances calculated by OM, similar sequences might be grouped together. The step is straightforward if OM was performed on a reference sequence, implying that the generated variable represents the similarity of each sequence with the reference sequence. The variable can be grouped by applying standard Stata commands, such as **xtile** or **recode**, or by using **generate** with functions like **inrange()**, **inlist()**, **autocode()**, and **recode()**. It is even sensible to not group the similarity variable at all, as in figure 5.

However, when you are performing OM on a sequence-by-sequence basis (i.e., **sqom** with the **full** option), the grouping step is indispensable. Cluster analysis is the most common technique for this step. A variety of methods for cluster analysis on a dissimilarity matrix are available with the official Stata command **clustermat** (see [MV] **clustermat**). All these methods can be applied to the dissimilarity matrix saved by **sqom**, **full** as well.

There is one trap in applying the **clustermat** command to the dissimilarity matrix created by **sqom**, which stems from the fact that the sequence data and the dissimilarity matrix have different dimensions. Besides user-specified **if** or **in** qualifiers, the dimensions of the dissimilarity matrix produced by **sqom** depend on the sequence concentration and on the number of sequences with gaps. The dissimilarity matrix cannot be attached to the sequence data on a row-by-row basis, which also applies to the results from the cluster analysis of the dissimilarity matrix. The SQ-Ados therefore contain a command that helps to link the results of the user-specified **clustermat** command to the original sequence data. Its syntax is

```
sqclusterdat [ , return keep(varlist) ]
```

Without the `return` option, the command constructs a dataset, which is built from instructions left over by the last `sqom` command. The user may specify arbitrary `clustermat` commands, as well as applicable `cluster` postestimation commands in this dataset. After performing the cluster analysis `sqclusterdat`, `return` merges the cluster results with the original sequence data.⁷

We now provide an example of the entire procedure, performing two different cluster analyses and drawing a dendrogram for the cluster analysis by using Ward's linkage. Finally, the results of both cluster analyses are attached to the original sequence data.

```
. sqclusterdat
. clustermat wardslinkage SQdist, name(wards) add
. clustermat singlelinkage SQdist, name(single) add
. cluster tree wards, cutnumber(20)
. sqclusterdat, return
```

You must use the `clustermat` option `add` to allow `sqclusterdat`, `return` to merge the cluster results with the original sequence data. If you accidentally use `clustermat`'s `clear` option, `sqclusterdat` will revert to the original sequence data without merging the cluster results.

At the end of the process, the sequence data contain the variables produced by the cluster analysis. The variables suffixed with `_hgt` can be used in the same fashion as the distance variable produced by OM on a reference sequence. We use it to produce yet another version of the sequence index plot (figure 6).

```
. egen plotorder2 = group(single_hgt length1 length2 length5 length3 length4)
(648 missing values generated)
. sqindexplot, order(plotorder2)
```

7. A convenience command, `sqclustermat`, performs the three steps with one command. Cluster postestimation commands do not work in this case, however.

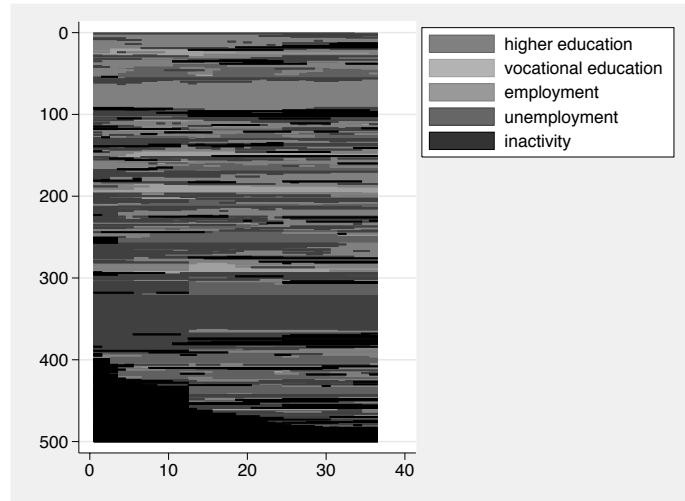


Figure 6: Sequence index plot with order from OM with option full

7 Appendix

7.1 The Needleman–Wunsch algorithm

Consider two vectors, R and C , that contain two different sequences of arbitrary length. Let m denote the length of R and n denote the length of C .

We start by constructing the $(m + 1) \times (n + 1)$ matrix L (the Levenshtein matrix) and initialize each cell with a zero. The cells of the first row and the first column of L are then filled with

$$\begin{aligned} L_{1,i} &= L_{1,i-1} + d; & i = 2, \dots, m \\ L_{i,1} &= L_{i-1,1} + d; & j = 2, \dots, n \end{aligned}$$

where d is the indel cost.

After initialization, the value of each cell $L_{i,j}$ ($i = 2, \dots, m$ and $j = 2, \dots, n$) is computed using the following recursive formula:

$$L_{i,j} = \min(L_{i-1,j-1} + s_{i,j}, L_{i-1,j} + d, L_{i,j-1} + d) \quad (1)$$

where $s_{i,j}$ is the substitution cost between the elements that are found in the sequences at the positions i and j , respectively. The unstandardized minimal distance between sequence R and C is in the cell $L_{m,n}$.

The algorithm was developed by Needleman and Wunsch (1970). It is an example of solving an optimization problem by dynamic programming and is guaranteed to find the minimal distance between two sequences.

7.2 Speed of sqom

The running-time complexity of the Needleman–Wunsch algorithm is $O(n^2)$, where n is the length of the sequences. To compute the distance between all N sequences, the algorithm has to be executed $N \times (N - 1)/2$ times. Therefore, the running-time complexity of `sqom` grows quadratically with both the length of sequences and the number of sequences being compared. If a substitution cost matrix is defined, the next factor that influences the running time of `sqom` is the number of elements (p) that constitute the sequences. For every comparison of items in two sequences, the program has to search for the appropriate substitution cost in the substitution cost matrix, implying the worst case of linear complexity $O(p)$ for every single comparison of elements. Several precautions were taken to decrease the running time of `sqom`.

First, comparison to a reference sequence is the default.

Second, the Needleman–Wunsch algorithm is applied only to different sequences. This precaution implies a little overhead for data screening, which is worthwhile only if there is a reasonable concentration of sequences in a dataset.

Third, the `k()` option excludes some alignments from consideration. With `k()`, only that part of the Levenshtein matrix where

$$\left| \frac{i}{m+1} - \frac{j}{n+1} \right| \leq K \frac{1}{\sqrt{2}} \frac{\frac{m+1}{n+1} + \frac{n+1}{m+1}}{\sqrt{(m+1)^2 + (n+1)^2}}$$

is calculated. If R and C have the same length, the program will explore the part of the Levenshtein matrix where the absolute difference between the horizontal and vertical index is less than or equal to K ($|i - j| \leq K$) (Kruskal and Sankoff 1983); i.e., the cells outside the middle region of the matrix are ignored. Practically, the `k()` option restricts the number of subsequent insertions/deletions that are allowed in the alignment of two sequences. The program will not find the minimum distance if the optimal alignment takes more than K subsequent insertions/deletions at some point. Thus using option `k()` implies no restriction if K is as large as n .

Finally, substitution costs are taken from the substitution cost matrix by using a so-called hash table, which is implemented as a vector of forward-linked lists. We solved a collision by chaining: all elements that hash to the same slot are inserted in an adequately linked list. Although searching for an element in the hash table can take as long as linear searching, under reasonable conditions the expected complexity is $O(1)$. Specifically, you should avoid the following features when constructing the set of your elements to assume constant complexity:

- The difference between two elements of sequences should not be multiples of 6,709, which is the principal number that we use for division when creating the hash function and is the length of the hash table.
- Avoid decimals in the set of sequences. The element is always rounded off by hashing. If a pair of decimal elements has the same integer part, the transformation is not injective and they will be inserted in the same cell of the hash table.

7.3 Limits

The memory complexity of the Needleman–Wunsch algorithm is $O(n^2)$. The algorithm is programmed with Mata, so the maximum sequence length is restricted to 2,147,483,647. Given that the human genome has around 3,000,000,000 base pairs, this limit imposes certain restrictions. There are, however, more severe restrictions imposed by Stata that apply to all SQ-Ados.

For the SQ-Ados, sequence data are expected to be in long format, which imposes no restrictions on sequence length. Much of the programming within the SQ-Ados is, however, done in wide format, so that the maximum sequence length is somewhat less than the number of variables allowed in the respective flavor of Stata (32,000 in Stata/SE and 2,047 in Intercooled Stata).

The command `sqom` with the `full` option stores its results by coercing a Mata matrix into a Stata matrix. The maximum dimension of that matrix is $11,000 \times 11,000$. Although one cannot manipulate this matrix with Stata's matrix commands, one can still perform a cluster analysis on the matrix regardless of the flavor of Stata and the setting of `matsize`.⁸

Given the limits and speed problems, the optimal matching as it is implemented in `sqom` seems capable of working with a moderate number of relatively short sequences. It has been tested using around 2,000 sequences with a maximum length of 100 positions.

8 Acknowledgments

Ben Goodrich made the text readable for native English speakers. Kenneth Higbee clarified what can (and cannot) be done in Stata with matrices created in Mata and placed back in Stata. We thank Richard Gates, William Gould, and Phil Schumm for providing help on Statalist. Ekaterina Selezneva pointed out bugs in previous versions of the program. Many thanks to all of them.

8. Also see <http://www.stata.com/support/faqs/mata/matsize.html>.

9 References

- Abbott, A., and J. Forrest. 1986. Optimal matching method for historical sequences. *Journal of Interdisciplinary History* 16: 471–494.
- Brüderl, J., and S. Scherer. 2004. Methoden zur Analyse von Sequenzdaten. *Kölner Zeitschrift für Soziologie und Sozialpsychologie* Sonderheft 44: Methoden der Sozialforschung: 330–347.
- Brzinsky-Fay, C. 2006. Lost in transition: Labour market entry sequences of school leaves in Europe, Discussion Paper SP I 2006-111, Wissenschaftszentrum Berlin. Discussion Paper SP I 2006-111, Wissenschaftszentrum Berlin.
<http://skylla.wz-berlin.de/pdf/2006/i06-111.pdf>.
- Cox, N. J. 2004. Stata tip 12: Tuning the plot region aspect ratio. *Stata Journal* 4: 357–358.
- Diggle, P. J., K.-Y. Liang, and S. L. Zeger. 1994. *Analysis of Longitudinal Data*. Oxford: Oxford University Press.
- Dijkstra, W., and T. Taris. 1995. Measuring the agreement between sequences. *Sociological Methods and Research* 24: 214–231.
- Kogan, I. 2003. A study of employment careers of immigrants in Germany. Mannheimer Zentrum für Europäische Sozialforschung: Arbeitspapier Nr. 66.
- Kohler, U. 2002. *Der demokratische Klassenkampf. Zum Zusammenhang von Sozialstruktur und Parteipräferenz*. Frankfurt a.M u. New York: Campus.
- Kohler, U., and C. Brzinsky-Fay. 2005. Sequence index plots. *Stata Journal* 5: 601–602.
- Kruskal, J. B., and D. Sankoff. 1983. An anthology of algorithms and concepts for sequence comparisons. In *Time Warps, String Edits, and Macromolecules: The Theory and Practice of Sequence Comparison*, ed. D. Sankoff and J. Kruskal, 265–310. Reading, MA: Addison–Wesley.
- Levenshtein, V. 1966. Binary codes capable of correcting deletions, insertions, and reversals. *Soviet Physics Doklady* 10: 707–710.
- Macindoe, H., and A. Abbott. 2004. Sequence analysis and optimal matching techniques for social science data. In *Handbook of Data Analysis*, ed. M. Hardy and A. Bryman, 387–406. London: Sage.
- Needleman, S., and C. Wunsch. 1970. A general method applicable to the search for similarities in the amino acid sequence of two proteins. *Journal of Molecular Biology* 48: 443–453.
- Rohwer, G., and U. Pötter. 2005. TDA's user manual.
<http://www.stat.ruhr-uni-bochum.de/pub/tda/doc/tman63/tman-pdf.zip>.

- Sankoff, D., and J. B. Kruskal. 1983. *Binary Codes Capable of Correcting Deletions, Insertions, and Reversals*. Reading, MA: Addison–Wesley.
- Scherer, S. 2001. Early career patterns: A comparison of Great Britain and West Germany. *European Sociological Review* 17: 119–144.
- Stovel, K. 2001. Local sequential patterns: The structure of lynching in the deep south, 1882–1930. *Social Forces* 79: 843–880.
- Waterman, M. 1995. *Introduction to Computational Biology*. London: Chapman & Hall.

About the authors

Christian Brzinsky-Fay is a political scientist at the Wissenschaftszentrum Berlin (Social Science Research Center). He is interested in labor market policy and education and is currently working on his dissertation with an application of sequence analysis for labor market data.

Ulrich Kohler is a sociologist at the Wissenschaftszentrum Berlin (Social Science Research Center) who has used Stata for several years. His research interests include social inequality and political sociology. With Frauke Kreuter, he is author of the textbook *Data Analysis Using Stata*.

Magdalena Luniak graduated in sociology from Warsaw University, where her focus was the application of mathematics in sociology. She now studies information technology at the Technical University of Berlin.

Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe

Christian Brzinsky-Fay

School-to-work transitions consist not just of one single event but of a sequence of transitions that varies significantly across both individuals and countries. In this article, I examine sequences of labour market statuses in 10 European countries using explorative methods of optimal matching (OM) and cluster analysis. The process of labour market entry is observed for the five years that follow school leaving by examining monthly labour market statuses. In order to reduce complexity, sequences are classified according to similarity, and eight distinct sequence types that correspond to the theoretical sequence typology developed by Sackmann and Wiggins (2003) are identified. Their distribution across countries is used to test the country classifications described by Marsden (1999) and Gangl et al. (2003), of which the latter has more explanatory power. Finally, the assessment of the quality of school-to-work transitions is carried out using indicators of volatility and integrative capability. These reveal the highest volatility in countries with well-established training systems and the highest integrative potential in countries with mainly general education.

Introduction

The transition between school and work is a critical period in the life of young people because their first access to the labour market can have a significant effect on their employment career over the entire life course (Korpi *et al.*, 2003). The school-to-work transition is more than just a single event for many reasons. For example, finding a satisfying job can be quite a time-consuming task and a number of uncertainties usually emerge during this process, which is already characterized by the need to make other important decisions, such as leaving the household of origin and forming one's own family. Moreover, because the labour market status of young people is not as well protected as that of older people, youth labour markets react more sensitively to socioeconomic changes (Gangl, 2002: 69). Finally, the process of labour

market integration is not necessarily completed by entry into one's first job. In consideration of these facts, transitional labour market policies (Schmid, 1998) seeking to facilitate a good school-to-work transition cannot be focussed on one single transition.

Thus, the school-to-work transition must be examined not as an event but as a period (Hillmert, 2002: 676). Research should focus on the entire sequence of changes in labour market status. In adopting this approach, we are confronted with the problem of complexity, however, because variations in time and type create a huge number of theoretically possible sequences. Consequently, one interesting aspect is the actual appearance of these transition sequences, as well as the changes in appearance as the institutional setting varies. Another important point is the fact that classifications of school-to-work transition regimes are made on a national basis. This may lead to

inaccurate policy measures that target only major groups. The aim of this article is to create a classification of similar sequences across countries. This approach may help policymakers to tailor their policies to the needs of specific target groups at a European level (McVicar and Anyadike-Danes, 2002). The main questions then become the following: are there distinct groups of labour market entry sequences among school leavers? If so, how country-specific are they and do they match conventional country groupings? Furthermore, which types of sequences lead to failure or success, in other words, in which kinds of transitions do school leavers get lost?

In order to carry out such a classification, one needs a longitudinal data set that both enables identification of labour market status sequences and contains comparable information on European countries. Both requirements are met by the European Community Household Panel (ECHP). Additionally, the classification of sequences requires an explorative method that meets the following demands: first, it should be able to compare a large number of individual transition sequences and, second, it should be able to group those sequences that are most similar. The techniques of optimal matching (OM) and cluster analysis, both of which are used here, satisfy these two demands. After an explanation of the theoretical framework and the hypotheses, the data and methodology used will be described subsequently. Finally, the empirical results will be presented and discussed.

Theoretical Framework

Research Review

There is already a large body of literature on school-to-work transitions at the micro-level. However, a crucial gap remains, which can be filled using the methodology proposed here. Nearly all of the research work in this field deals with a single event, such as the transition from one labour market status to another (e.g. from education to employment or unemployment) and its effects and preconditions (Scherer, 2005). Sequences of school-to-work transitions are rarely examined as full series. Exceptions to this trend are McVicar and Anyadike-Danes (2002), who examine the school-to-work transitions of school leavers in Northern Ireland, and Scherer (2001), who compares transition patterns in Germany and Great Britain. Both works use OM to calculate distances between transition sequences. However, there is no comparison of sequences for more than two countries.

The empirical analysis of labour market sequences in general is a relatively new approach, whose theoretical foundations have been developed through sociological life-course research (Sackmann and Wiggins, 2003). Sequences are seen as a concept that connects the macro-level, represented by the concept of trajectories, and the micro-level, represented by the single transition. A sequence is defined as 'any life-course movement that includes at least two transitions between states (in a given state space)' (Sackmann and Wiggins, 2003: 96). Within this concept, sequence types are constructed to capture policy-relevant forms of sequences (Table 1). For example, the type 'rupture' reflects only a single change with an absorbing status at the end, 'interruption' indicates the continuation of a status after an interlude, while 'change' consists of three different statuses. The other three sequence types represent combined forms involving apprenticeships or further education, given that both can be seen as a combination of education and employment. In the 'bridge' type, apprenticeship leads from education to employment, whereas in the 'return' type apprenticeship leads back to education. The 'fusion' type describes the combined state (further education) after completion of the two 'pure' states (education and work). This article will also empirically test these theoretical sequence types.

In order to decide how best to design youth unemployment policies, it is essential to know the empirical characteristics of transition sequences. These are captured by two indicators: volatility and integrative potential. The volatility of a transition sequence can have positive or negative effects,

Table 1 Theoretical sequence types of school-to-work transitions (Chapter 2)

Sequence type		School-to-work sequences
Rupture	$A \rightarrow B$	School \rightarrow Work
Interruption	$A \rightarrow B \rightarrow A$	School \rightarrow Work \rightarrow School
Change	$A \rightarrow B \rightarrow C$	School \rightarrow Work \rightarrow Non-employment
Bridge	$A \rightarrow AB \rightarrow B$	School \rightarrow Apprenticeship \rightarrow Work
Return	$A \rightarrow AB \rightarrow A$	School \rightarrow Apprenticeship \rightarrow School
Fusion	$A \rightarrow B \rightarrow AB$	School \rightarrow Work \rightarrow Further education

Source: Sackmann and Wiggins, 2003: 102.

depending on the status of the individual who is making the change. In this respect it is argued that the major problems regarding the labour market integration of young people are their lack of work experience and the lack of information about their vocational qualifications, both of which inhibit potential employers from hiring them. This risk decreases when young people participate in further education, an apprenticeship or a combination of the two. The volatility indicator is simply defined as the proportion of employment, education and apprenticeship episodes in relation to total episodes. The higher the value of this indicator, which ranges from 0 to 100, the more favourable are the sequences with respect to flexibility in the particular country. The integrative capability of a transition type is a measure of how quickly and to what extent young people enter employment. This property can be assessed by adding up the number of employment episodes, which are weighted by their position within the sequence. Later employment episodes are given a higher weight in order to underline the process of integration. This indicator also ranges from 0 to 100, and a high value indicates a good integrative character.

The question as to how countries can be classified into institutional regime types is answered from two perspectives—the economic and the sociological. From an economic perspective, two types of school-to-work transition regimes are distinguished: internal labour markets (ILM) and occupational labour markets (OLM) (Shavit and Müller, 1998; Marsden, 1999; Gangl, 2003). The former systems are characterized by a lack of clear vocational qualification signals to employers: only general education is standardized, and occupationally specific skills are not provided. Therefore, firms tend to fill vacancies from the pool of their current employees rather than recruiting them externally. This leads to uncertain prospects during the entry period and a relatively low level of occupational segmentation because labour market allocation relies on work experience that must be gained over time. However, upward mobility

in ILM systems is greater than in OLM systems. In countries with OLMs, vocational education is highly standardized and the definition of qualifications is very clear for employers. Hence, firms tend to recruit new employees externally, stable employment positions can be reached more rapidly and occupational segmentation becomes very strong.

From a sociological viewpoint, Gangl *et al.* (2003) distinguish between three patterns of school-to-work transitions depending on differences in educational systems. First, countries with extensive vocational training systems at the upper-secondary level have a low proportion of people who do not progress after compulsory school and significant proportions of upper-secondary school leavers with vocational qualifications. Second, countries with an emphasis on general education at the upper-secondary level normally have a higher proportion of people who do not progress after secondary level. Finally, countries with a low level of educational attainment have only weakly developed vocational training systems. Table 2 provides an overview of the classification of countries.

Germany and Great Britain are often viewed as representative with respect to the process of coordination between the educational system and the labour market (Scherer, 2001; Hillmert, 2002; Scherer, 2005). Whereas in Germany this process is highly standardized and stratified (Allmendinger, 1989; Shavit and Müller, 1998), coordination between education and employment in the United Kingdom is comparatively loose (Hannan *et al.*, 1997). The explanatory power of the ILM/OLM dichotomy and Gangl *et al.*'s classification will be tested here for other countries, too, using the findings on transition sequences.

Hypotheses

It must be borne in mind that in talking about clusters of transition sequences we are talking about ideal types of sequences; that is, each of the clusters has a more or less significant degree of variation across countries.

Table 2 Classifications of countries according to school-to-work transitions (Chapter 2)

ILM	OLM	General qualifications	Extensive vocational training systems	Lower level of educational attainment
AUS, UK, US, IRE, JAP, FRA	AUT, DK , GER, NL, SW	UK, IRE, FRA, BEL	AUT, DK , GER, NL, SW, FIN	ITA, ESP, POR, GRE

Note: Countries that are considered in this article are in bold.

Sources: Marsden (1999), Gangl (2003), Gangl *et al.* (2003).

H1: Despite a high degree of cross-national variation, all types of transition sequences appear in each country.

The different shares of sequence types reflect the manner in which institutional features shape school-to-work transitions. However, there are other factors that influence individual sequences of labour market statuses, so there will be no monolithic picture in any country.

H2: Countries with ILM systems will show more changes between labour market statuses than countries with OLM systems.

For a classic ILM system—like that found in the United Kingdom or Ireland—where substantial flows between employment and unemployment are the rule during the labour market entry period (Scherer, 2001; Detzel and Rubery, 2002), one can expect that one or more types with these transitions will be predominant. Furthermore, rapid integration into first employment should occur in these countries as well. In Germany and Denmark, where a significant number of young people are integrated through the vocational training system, the major sequence type after participation in an apprenticeship will lead directly to employment (Detzel and Rubery, 2002: 110) or, in other words, to ‘lower turbulences at labour market entry’ (Scherer, 2001: 121).

Apart from the empirical questions, the more normative question of favourable school-to-work transitions must also be raised here. This is done by concentrating on particular properties of transition sequences: volatility and integrative capability.

H3: Countries with extensive vocational training systems will have more positive volatility than countries without these systems.

Several transitions between education, employment and apprenticeship can be expected in countries with a well-developed system of further training—such as Denmark (OECD, 2005)—or with an established apprenticeship system—such as Germany (OECD, 1998). On the other hand, negative volatility can be expected in countries with a low degree of institutional coordination between the educational system and the labour market, such as the United Kingdom, Italy, and Spain.

H4: High integrative capability exists in countries where the coordination process between the educational system and the labour market is either structured (extensive vocational training systems) or emphasizes the temporal dimension of labour market integration (general qualifications).

It is to be expected that the integrative potential in the southern European countries will be rather low,

whereas in the United Kingdom, where the temporal dimension of the integration process is emphasized (Hillmert, 2002), it will be relatively high. For Germany, where the integration process between the educational system and the labour market is highly coordinated, it seems reasonable to expect a high level of integrative capability.

Data Set and Basic Concepts

The only comparative data set available that contains monthly information on labour market statuses is the European Community Household Panel (ECHP). This is a longitudinal data set that covers the Member States of the European Union from 1994 to 2001. It encompasses a large variety of variables relating to a number of socioeconomic issues at the individual and the household level.¹ The most important micro-level factors with respect to the labour market integration of young people are age, gender, educational attainment, work experience, and duration of unemployment (Franz *et al.*, 2000; Russell and O’Connell, 2001; Gangl, 2003), all of which are included in the survey.²

Four countries must be excluded from the analysis on technical grounds. The calendar variables for Sweden and the Netherlands are not available, so that it is impossible to analyse Swedish and Dutch transition patterns. Luxembourg, Austria, and Finland must be excluded because there are too few valid cases.

To define the beginning of school-to-work transitions, we first have to decide whether education stops after full-time schooling or whether apprenticeships are also part of the educational system. Here, apprenticeships are seen as not belonging to education for three reasons: first, apprenticeships are connected to a particular vocation by way of their content. Second, work experience is provided either through a job or through vocational training such as an apprenticeship, but not by general education. And, third, in order to identify the relevance of apprenticeships for school-to-work transitions, it is necessary to examine their form and duration within the transition period.

The definition of the end of school-to-work transitions is more ambiguous. Nonetheless, it is necessary to set a limit on the maximum length of the sequences, for the longer the duration of this defined period, the less precise is its character as a ‘school-to-work transition’. Simple indications for this definition are not sufficient, for to let this period end with the beginning of the first job is to ignore later

episodes of unemployment, inactivity and/or education. We can attempt to define the end of school-to-work transitions from an aggregate point of view and take as the end the point in time when the employment rate of young people reaches 50 percent (Ryan, 1999). In this case, the duration of school-to-work transitions would differ from country to country, which reduces the level of comparability. Yet, constant time periods must be used when assessing quality in terms of the efficiency of school-to-work transitions across countries. Hence, the length of the school-to-work transition is fixed and delimited to 5 years, which, while arbitrary, is still a time span that follows other studies in the field (e.g., Scherer, 2001). Moreover, apprenticeships can last for up to 3 years, and because they do not count as education here, it seems prudent to define a longer-lasting transition period.

The calendar data for labour market status are retrospective and cover the period from January 1993 to December 2000, which amounts to 96 months. The sequences are pooled,³ so that the sample contains all persons who finished general schooling and are observable for 5 years thereafter.⁴ To avoid distortion by outliers, people older than 30 years of age are excluded. The recoded categories of the monthly calendar variables are 'employed', 'unemployed', 'apprenticeship', 'inactive', and 'education'. Employment includes self-employment and dependent employment; inactivity includes housework, family care, and military service; and 'education' includes both university education and further education.

The problem of 'left censoring' can be solved by using other variables as proxies in order to obtain this information and to keep as many individuals as possible in the analysis. For this purpose, the ECHP includes a variable for people who have not worked before, a variable that indicates the age at which the individual concluded his or her education, and a variable that reports the age at which the individual started to work.

Methodology

The analysis consists of three parts. First, general characteristics of the transition sequences are described. Second, differences between individual sequences are calculated through the use of OM.⁵ Because this algorithm is only able to calculate distances between sequences, the grouping of the sequences with similar distances is carried out in a third step using cluster analysis. Finally, the clusters

are described and their distribution across countries is examined.

OM is an explorative method of sequence analysis developed by molecular biologists in order to find similar patterns within DNA. It was first introduced into the social sciences by Andrew Abbott and John Forrest (1986).⁶ Meanwhile, in labour market research there is an increasing number of applications of OM to life courses and career patterns, in general (Halpin and Chan, 1998; Pollock *et al.*, 2002), and with respect to youth, in particular (Scherer, 2001; McVicar and Anyadike-Danes, 2002).

OM is very useful when data have three properties: first, a large number of sequence statuses; second, a complex structure of statuses; and, third, a fixed order of statuses that must be taken into account for analysis. In such a case, confirmatory techniques such as event-history analysis become inadequate (Halpin, 2003: 7). Although these can deal well with single events or a few events and their effects and preconditions within a sequence of labour market statuses, because of the fact that they cannot take into account the entire sequence they actually ignore valuable information. OM now provides a measure for these confirmatory methods that enables periodical information to be incorporated into the models.⁷ The distance between two sequences is—roughly speaking—the number of steps one must perform in order to make both sequences equal. In this procedure, which is named 'alignment', there are three operations available: an item can be substituted by another item, an item can be inserted into the first sequence, or an item can be deleted from the first sequence. The latter two operations are subsumed to so-called indel (insert and delete) operations. Because there is more than one solution for the alignment of two sequences, the OM algorithm always calculates the minimum distance between two sequences. The decision regarding the quantification of these operations is left to the researcher and must be justified by theory. With respect to labour market statuses, indel costs are set as equal to 1, whereas substitution costs will always be 2.⁸ The matrix consisting of distances for each pairwise combination of single sequences is built in a cluster analysis as a dissimilarity measure. In the second step of cluster analysis, Ward's hierarchical fusion algorithm is used to explore groups of sequences. Because conventional test statistics are not applicable with sequence data, contextual arguments are used to define the appropriate number of clusters, such as the observation of analytically meaningful groups and a sufficient number of cases.⁹

Labour Market Entry Sequences

Aggregated Characteristics of Labour Market Entry Sequences

The first step in describing labour market statuses is to consider aggregated indicators such as the average duration of statuses, and the average number of episodes in specific statuses and in general (Table 3). The average duration of statuses is the sum of the total number of months spent in one status, regardless of whether these months ran consecutively or not. Hence, this measure reflects the overall frequency of this particular status. The average number of episodes means the number of episodes in all statuses. It can be taken as a measure of the flexibility of transition sequences. In order to obtain a more accurate picture, this measure can be broken down by status type and an indicator can be calculated which allows assessment of the level of volatility.

There is substantial variation in all variables across countries. Looking at the average duration of education within the first five years after leaving school, one can see that young people in Denmark pursue some form of education for 21.7 months on average. Irish school leavers spend more than a quarter of this period in education. In the United Kingdom, only 4.7 of the 60 months are spent in education, in Greece only 5.5 months. Germany has a long average duration of apprenticeship, which reflects this country's institutionalized apprenticeship system: on average, young people are in this status for more than 16 months. Apprenticeship plays an important role in Denmark, too, which is viewed as having a hybrid system (OECD, 1998) and where 6.5 of the 60 months are apprenticeship months. The highest values of average duration in employment can be found in the United Kingdom, France, Belgium, and Ireland. In all these countries, school leavers spend more than half of the observation period in employment. In Italy, Greece, and Spain, unemployment is a common experience for labour market entrants. In Italy, school leavers are in unemployment for 25 months; in both Greece and Spain this status adds up to more than 18 months. Denmark, Germany, and Ireland have the shortest unemployment durations. Country-specific differences are also evident with respect to inactivity. For example, Greek labour market entrants are inactive for 12.7 of the 60 months, whereas their Irish counterparts spend only 2.1 months in inactivity.

As regards the average number of episodes, the differences between countries are surprisingly insignificant. In Denmark, school leavers experience almost six episodes within the observation period, compared to an average of 3.5 different episodes in Portugal. According to Gangl *et al.* (2003), there is no clear-cut difference either between ILM systems and OLM systems, or between country groups. Germany, with its classic OLM system, has more status changes than the United Kingdom, which represents the classic ILM system. The same is true for the comparison between Denmark and Ireland. Thus, the second hypothesis must be rejected. A more differentiated picture of the number of episodes can be drawn if the particular status type is taken into consideration.

The volatility indicator shows a positive situation in Ireland, Germany, and Denmark, and a less favourable situation in France and the United Kingdom. Italy and Greece are the worst performers with respect to this indicator. The third hypothesis is therefore confirmed: the high values of positive volatility in Ireland, Denmark, and Germany clearly correspond to the existence of initial or further training systems. Gangl *et al.*'s country classification is also confirmed; in other words, Germany and Denmark show high volatility values and the southern European countries show low values, whereas the countries with general qualifications have medium values—with the exception of Ireland. As regards, the integration indicator, it emerges that the countries with general qualifications have higher values than the others. Hence, the fourth hypothesis is only partly confirmed, namely for those countries with an emphasis on the temporal dimension of the integration process, such as the United Kingdom, France, Belgium, and Ireland. Countries in which the integration process is structured do not have a higher integrative potential than those in which it is not.

Although an examination of the monthly breakdowns of the different statuses ignores the sequential character of transitions, it still has the advantage of providing an aggregate picture of the share of school leavers in each labour market status and the development of these shares throughout the transition period. The breakdowns show evident disparities across countries (Figure 1).¹⁰ Germany stands out most clearly with its high number of apprenticeship statuses in the first three years after completion of schooling. Germany is also the only country where the share of young people either in education, in apprenticeship, or in employment decreases slightly over time. Apprenticeship also plays a significant role in Denmark and the United Kingdom. In the latter

Table 3 Aggregated characteristics of labour market entry sequences (Chapter 5)

	Countries										Cluster								Total
	UK	IRE	FRA	BEL	ITA	ESP	POR	GRE	DK	GER	1	2	3	4	5	6	7	8	
											Link	Return	Failure	Detour	Dropout	Bridge	Break	Express	
Average duration in ...																			
Education	4.7	16.7	6.4	12.8	11.1	11.8	11.2	5.5	21.7	7.4	32.8	45.0	5.9	1.6	1.9	3.1	7.3	0.7	9.6
Apprenticeship	0.9	2.7	0.0	1.7	1.6	0.9	0.1	0.3	6.5	16.2	0.9	0.7	1.0	0.8	0.2	23.8	0.3	0.2	2.5
Employment	38.8	33.4	37.3	34.2	15.0	21.4	28.9	23.0	23.7	25.3	18.9	6.4	9.1	25.6	2.7	27.4	36.3	53.4	27.8
Unemployment	7.6	5.1	7.6	8.6	25.0	18.6	9.2	18.4	4.0	4.2	3.5	4.0	39.1	28.1	8.2	3.3	5.4	4.3	12.6
Inactivity	8.1	2.1	8.7	2.7	7.2	7.2	10.6	12.7	4.1	6.9	3.9	3.9	5.0	3.9	47.0	2.3	10.7	1.4	7.6
Average number of episodes in ...																			
Education	0.3	1.4	0.5	0.5	0.6	0.8	0.5	0.3	1.3	0.4	1.8	1.7	0.5	0.2	0.2	0.3	0.8	0.1	0.6
Apprenticeship	0.1	0.2	0.0	0.2	0.2	0.1	0.0	0.1	0.5	0.8	0.1	0.1	0.1	0.1	0	1.1	0.1	0	0.2
Employment	1.7	2.3	1.7	1.6	1.0	1.7	1.3	1.2	2.2	1.7	2.3	1.2	1.3	1.8	0.4	1.8	2.1	1.7	1.6
Unemployment	1.1	0.8	1.1	1.0	1.3	1.6	0.9	1.3	0.9	0.6	0.7	0.6	2.2	1.9	0.6	0.6	1.1	0.8	1.1
Inactivity	0.5	0.3	0.7	0.7	0.6	0.6	0.8	0.7	0.9	0.4	0.7	0.6	0.6	0.4	1.4	0.3	1.1	0.2	0.6
Average number of episodes (total)	3.6	4.9	4.0	4.0	3.6	4.8	3.5	3.6	5.8	4.0	5.7	4.2	4.6	4.5	2.6	4.3	5.2	2.9	4.1
Integration indicator	68.3	61.3	67.9	63.7	30.2	42.4	55.3	46.6	37.8	48.2	41.8	7.3	15.1	60.6	4.9	55.6	76.5	91.9	52.0
Volatility indicator	64.0	77.0	61.2	61.2	42.5	51.7	52.6	44.2	71.6	72.8	73.9	67.3	33.2	48.0	14.3	81.0	56.6	73.6	57.5
N	346	221	622	143	562	383	181	259	99	273	183	334	531	260	242	258	423	858	3089

Source: ECHP, own calculations.

country, apprenticeships are mostly confined to the first two years after leaving school, whereas they are spread over the entire period in Denmark. Another striking fact is the very high share of unemployment in Italy, Greece, and Spain. Between 70 percent and 90 percent of young people are unemployed or inactive immediately after leaving school in these countries. Within five years this share decreases to a level of between 25 percent in Spain and 40 percent in Italy and Greece. Relatively high shares of unemployment and inactivity can also be found in Belgium, France, Portugal, and the United Kingdom. The share of employment increases in all countries, with the exception of Denmark, where it remains stable across the entire observation period. At the same time, Denmark is characterized by a high and stable level of education.

These aggregate measures provide important information about the shares of specific labour market statuses at the macro-level, but they do not take transition sequences as a whole into account. In addition, they do not reflect the complexity of individual transition sequences. Therefore, it is

necessary to cluster similar sequences, where the clusters are as distinct as possible from each other.

Clusters of Labour Market Entry Sequences

The general characteristics of the eight clusters are shown in the second part of Table 3. The sequences in the first cluster are characterized by education and employment, which on average amount to 32.8 and 18.9 months, respectively, within the first five years of leaving school. The volatility of this cluster is relatively high, the integration indicator is at a medium level and the average number of episodes is the highest among all the clusters. The second cluster consists mainly of education and the volatility is at a high level. The integrative potential of this sequence type is the second lowest among the clusters. Unemployment constitutes the most important status in the third cluster, which has both low volatility and low integrative potential. The fourth cluster is mainly composed of employment and unemployment and has a higher integrative potential than the first three clusters, whereas its volatility is at a medium level. The sequences of the fifth cluster contain an average 47 months of inactivity,

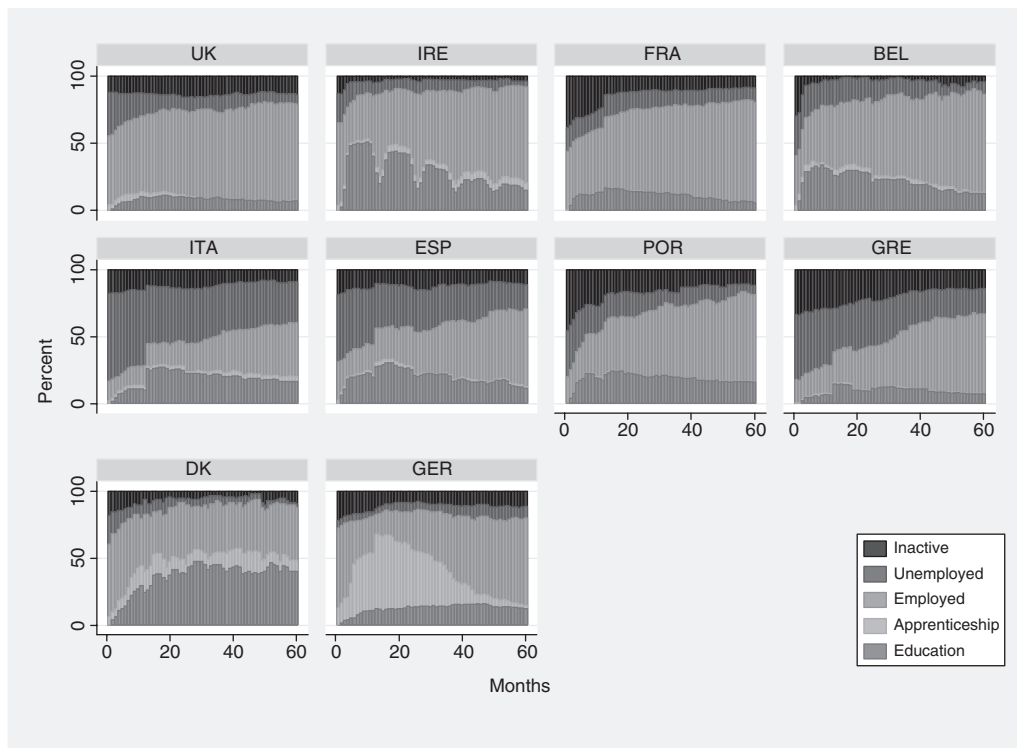


Figure 1 Monthly shares of statuses by country. (Source: ECHP, own calculations.)

show the lowest levels of integration and volatility, and have the smallest number of episodes. The sixth cluster includes, on average, 23.8 months of apprenticeship and 27.4 months of employment. It exhibits the highest volatility—at a value of 81—but a medium value for integrative potential. The seventh cluster of sequences is composed mainly of employment (36.3 months), but also has substantial shares of inactivity (10.7), education (7.3), and unemployment (5.4). The average number of episodes is quite high, and so is the integration indicator, whereas volatility remains at a medium level. The eighth and last sequence type consists of 53.4 months in employment. In addition, it has the highest integrative potential and very high volatility.

To examine the sequential character of the transition process, it is necessary to look at the graphical display of individual sequences by cluster (Figure 2). This step not only nicely illustrates the complexity of school-to-work transition sequences, but also explains the labels given to the clusters. In the first cluster, education is concentrated at the beginning and employment at the end of the observation period. Because in nearly all of the cases further or higher education leads to

employment, this cluster can be called the ‘link’ cluster. In the second cluster, the vast majority of school leavers are employed at the beginning of the observation period, many are inactive and some are unemployed. The share of education then increases sharply and remains at a very high level throughout the entire five years. According to Sackmann and Wingens’ (2003) sequence typology, this cluster is primarily built on ‘return’-type sequences and, therefore, can be called the ‘return’ cluster. Unemployment is the primary status in the third cluster, and it is spread evenly across the five-year period. Consequently, this cluster can rightly be called the ‘failure’ cluster. In the fourth cluster, most of the unemployment statuses are at the beginning of the observation period, and the vast majority of these sequences conclude with employment. The sequences in this cluster can be denoted ‘detours’ because although school leavers do not enter employment directly, they still ultimately end up there. In the fifth cluster, inactivity is the most important status. Because the majority of the small number of employment statuses is found at the beginning of the period, this cluster can be labelled the ‘dropout’ cluster.

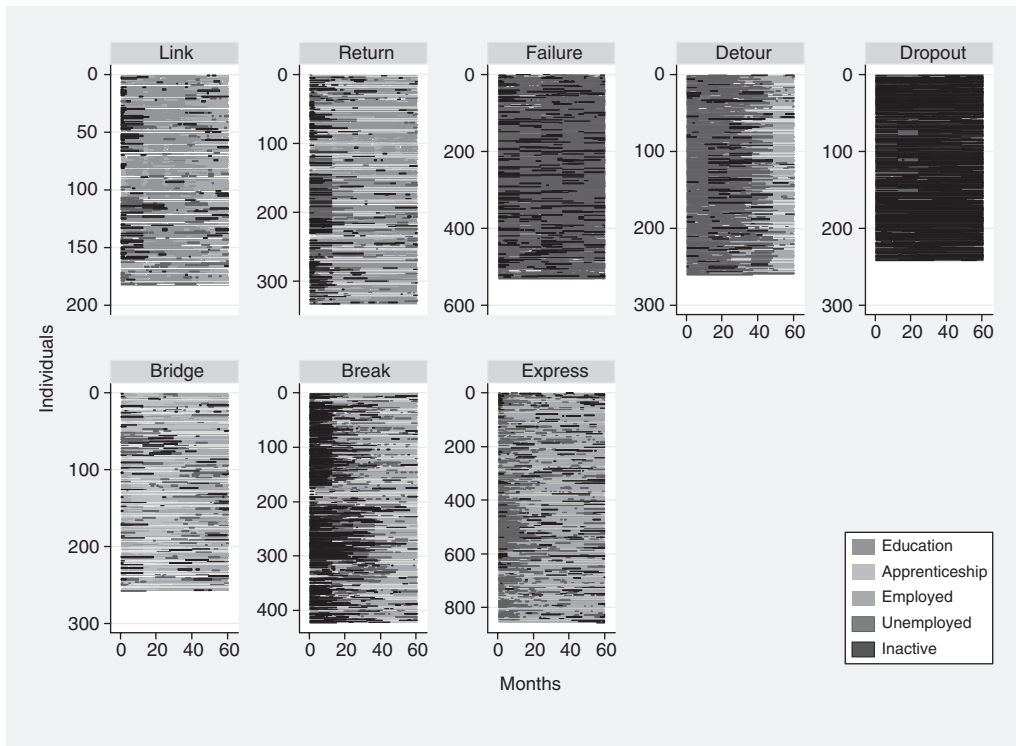


Figure 2 Sequence index plots by cluster. (Source: ECHP, own calculations.)

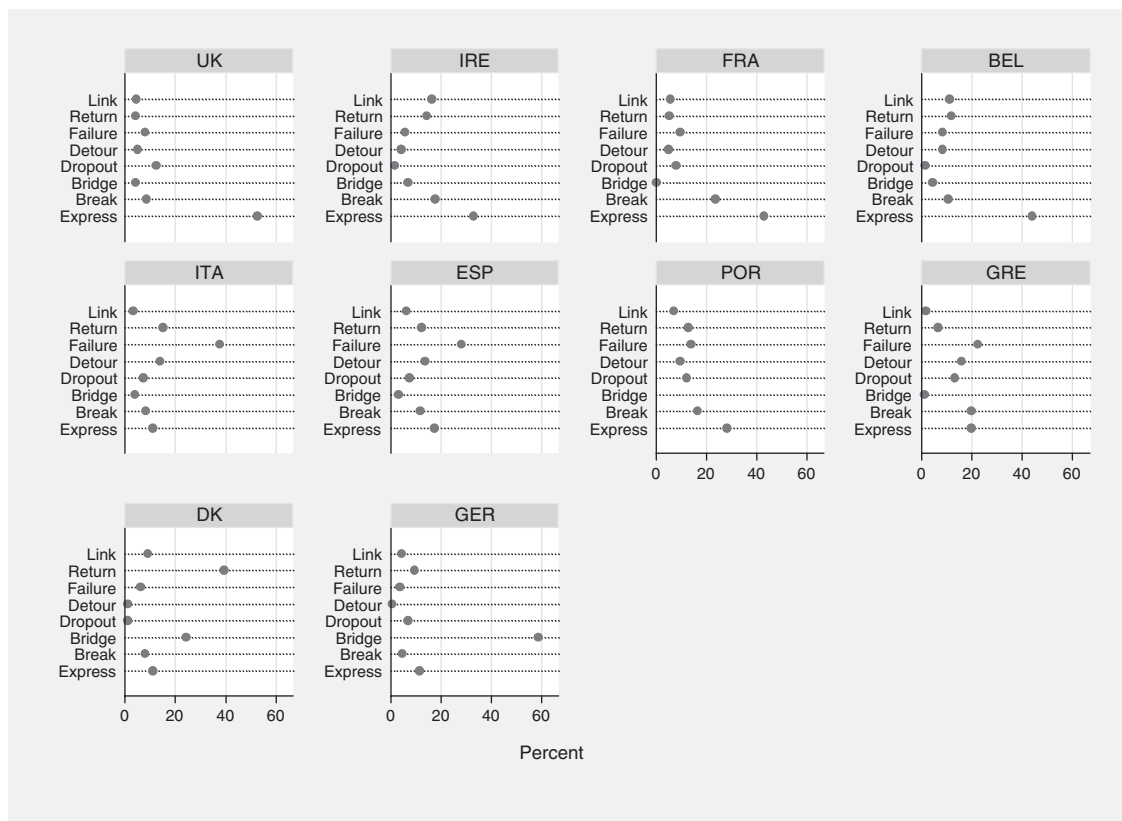


Figure 3 Appearance of cluster in countries. (Source: ECHP, own calculations.)

The corresponding type in Sackmann and Wingens' theoretical typology is 'rupture', which is also true for the 'failure' sequence type. Apprenticeship is the most distinctive status in the sixth cluster, where the great majority of the sequences end up in employment. This sequence type corresponds perfectly to the 'bridge' type in the theoretical typology and is therefore labelled 'bridge' cluster. The seventh cluster also leads in most cases to employment, but at the beginning it is composed of different statuses, of which inactivity and education are the most frequent. Because the starting episodes are brief in duration, it seems reasonable to interpret them as 'waiting loops', where young people take up work only as an interlude between general and higher education. Hence, an appropriate name for this cluster is 'break'. Finally, the most successful school-to-work transitions are undoubtedly located in the eighth cluster, where only a very small share of statuses other than employment appear. Because these statuses are found at the very beginning, this cluster is called the 'express' cluster.

Distribution of Sequence Types across Countries

As Figure 3 shows, the incidence of the clusters also varies substantially across countries. With the exception of the 'bridge' cluster, all the clusters appear in all countries. Therefore, the first hypothesis is largely confirmed. Moreover, there are some country characteristics that support Gangl *et al.*'s (2003) classification. In the group of countries with general qualifications, the 'express' cluster is clearly the most important labour market entry sequence. This means that the majority of school leavers in these countries enter employment directly. The 'break' type plays a role of some importance only in France and Ireland. The largest shares of 'failure' sequences can be found in the southern European countries, whereas sequences of the 'bridge' and of the 'link' type do not play a significant role at all in these countries. The two countries with an extensive vocational training system show the highest shares of 'bridge' sequences and low

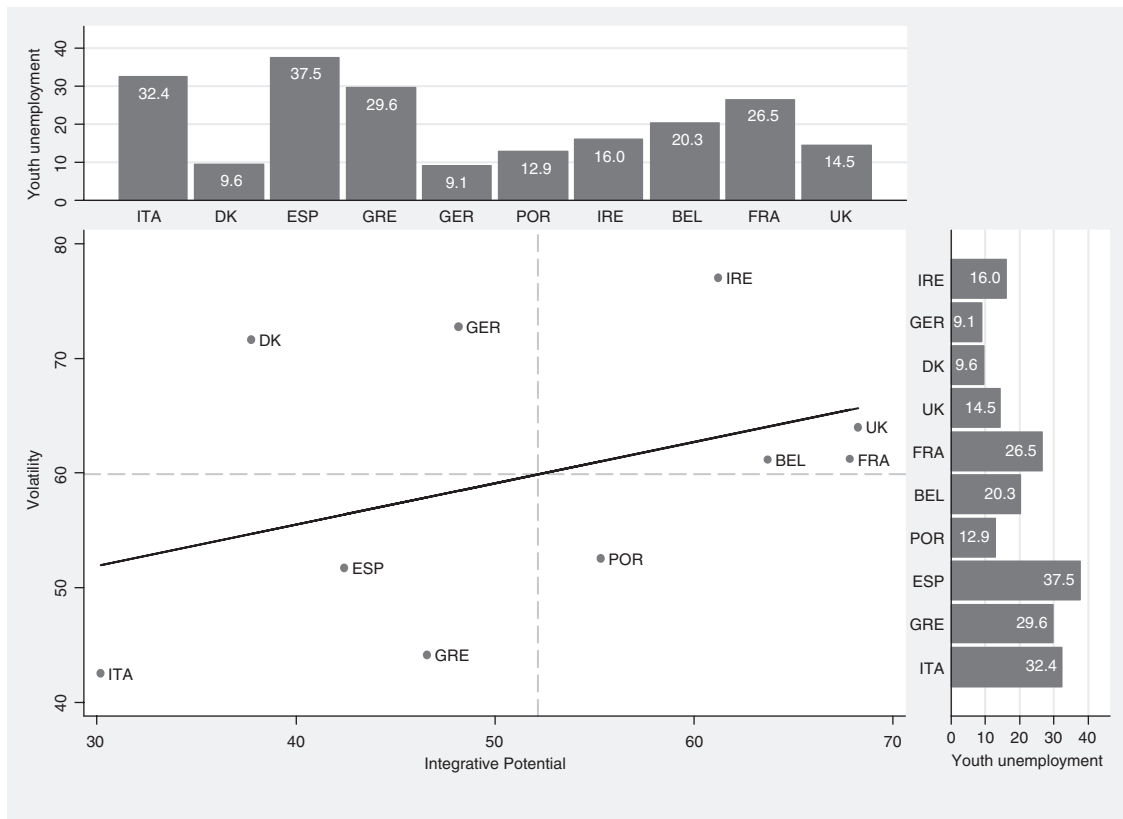


Figure 4 Volatility, integrative capability, and youth unemployment. (Source: ECHP & EUROSTAT, own calculations.)

shares of ‘express’ sequences. Denmark additionally has by far the highest share of ‘return’ sequences, which is a result of its well-established training system. The ILM/OLM classification is supported as well, but to a lesser extent, because it is only based on a few countries under consideration here.

The quality of labour market integration within different countries and the countries’ transition regimes can now be assessed using the two indicators derived from the sequence characteristics. Figure 4 shows the volatility and integration indicator from Table 3 and also the average youth unemployment rate from 1993 to 2000 at the top and at the right-hand side, whereas the countries are sorted according to the respective indicator. As the scatterplot shows, the countries fall into groups very much according to Gangl *et al.*’s classification: countries with mainly general education show both an integrative potential and a volatility that are clearly above the average, whereas only the level of volatility is above average in countries with extensive vocational training systems.

The southern European countries show low values for both indicators. The comparison between the indicators and the average rate of youth unemployment reveals only a weak correlation between integrative potential and youth unemployment. There is a stronger correlation between volatility and youth unemployment. This leads to the conclusion that the quality of school-to-work transitions can only be fully assessed if sequential information is also taken into account. Both characteristics—integrative potential and volatility—are not well reflected by the commonly used indicator of youth unemployment.

Conclusions and Outlook

For a comparative analysis of school-to-work transitions, the sequential character of labour market statuses must be taken into account; by this means, valuable information about country- or group-specific transitions can be obtained, which can be used in turn to develop adequate policies. This approach requires

the use of explorative methods because the vast number of theoretically possible sequences makes it infeasible to handle them as unique cases. The OM algorithm can calculate a dissimilarity measure that takes into account the sequential character of the five-year period of labour market statuses immediately after leaving school. Cluster analysis groups the sequences into eight coherent clusters based on their characteristics and the theoretical sequence typology developed by Sackmann and Wingens (2003). The incidence of these clusters varies widely across countries for they reflect different institutional configurations and related policies. It is remarkable that—apart from the ‘bridge’ sequence type—all the clusters appear in every country, so that Hypothesis 1 is confirmed. The most country-specific clusters are the ‘return’ cluster for Denmark and the ‘bridge’ cluster for Germany. Within the group of southern European countries, the ‘failure’ cluster is very common. Typical for the countries with mainly general education is the ‘express’ sequence type. This finding very much supports the classification presented by Gangl *et al.* (2003), whereas the ILM/OLM dichotomy can only be weakly confirmed because the number of status changes proves to be independent of labour market type (Hypothesis 2). Because of the limited number of countries it relies on, this dichotomy has only weak explanatory power regarding labour market entry sequences.

Two indicators served as an auxiliary means to estimate the overall quality of transition regimes. First, Ireland, Germany, and Denmark can be considered to have the best volatility in relation to other countries. In parallel, these countries have well-established initial and/or further training systems, so that Hypothesis 3 is confirmed. Second, high integrative potential is found in the United Kingdom, France, Belgium, and Ireland. In Denmark and Germany, the coordination process is considered to be structured; in countries with mainly general education, the temporal dimension of the integration process is emphasized. The fourth hypothesis is therefore only confirmed for the latter case.

National policies that aim to facilitate the labour market integration of young people must, of course, take national peculiarities into consideration. It could, however, be useful to create policies at the European level that are targeted at groups with specific kinds of transition sequences and that could be adopted across national borders.

For the purpose of a more thorough examination of the quality of school-to-work transitions, it would be useful to take a closer look at the social characteristics of the people in the different clusters. Thus, a future

application of the sequence typology might be, for example, to include the cluster affiliation in confirmatory models in order to study the causes of particular sequence types, on the one hand, and the effects of certain transition sequences on income, participation in further training or job mobility, on the other. Furthermore, sequence analysis provides a basis for defining important events in transition periods that can be used within event-history models. The individual sequence types can be used for analysis at the micro-level, although the number of observations may cause some difficulty. Alternatively, sequence information can be used at the macro-level—in terms of country shares of certain sequence types—but the causal structure would then have to be abandoned.

Notes

1. For further details, see Peracchi (2002).
2. Work experience and unemployment duration can be ignored here because sequences begin with the first month after leaving school.
3. A test with four annual samples yields no significant variation of sequences over time.
4. The sample is assumed to be representative to the same extent as the ECHP in general. However, the retention ratios are quite stable across countries (Eurostat, 2002), so that comparability is assured.
5. The author, together with Ulrich Kohler and Magdalena Luniak, has created a bundle of OM commands for the software package Stata. It is available from the SSC archive on <http://ideas.repec.org/s/boc/bocode.html>. Also see Brzinsky-Fay *et al.* (2006).
6. Abbott and Tsay (2000) provide an overview of OM applications in the social sciences.
7. For further information about OM, see MacIndoe and Abbott (2004).
8. Different variants of substitution and indel costs were tested for sensitivity, but results showed only slight differences.
9. For a discussion of cluster analysis in general, see Everitt *et al.* (2001).
10. Coloured graphs can be downloaded from the author's web site: http://www.wzb.eu/~brzinsky-fay/lost_in_transition.en.htm and have been reproduced here as Supplementary Data.

Supplementary Data

Supplementary data can be viewed online at <http://www.esr.oxfordjournals.org>.

Acknowledgements

For valuable comments and stimulating discussions I thank Maria A. Davia, Anette Fasang, Joris Ghysels, Philip O'Connell, Paul Ryan, Chiara Saraceno, Günther Schmid and the anonymous reviewers of the ESR. Moreover, I would like to express my gratitude to Ulrich Kohler for his valuable and motivating cooperation in programming the sequence commands for Stata. In this respect, we both thank Josef Brüderl, Ulrich Pötter, Götz Rohwer, and Stefanie Scherer for helpful comments.

References

- Abbott, A. and Forrest, J. (1986). Optimal Matching Method for Historical Sequences. *Journal of Interdisciplinary History*, **16**, 471–494.
- Abbott, A. and Tsay, A. (2000). Sequence Analysis and Optimal Matching Methods in Sociology. *Sociological Methods & Research*, **29**, 3–33.
- Allmendinger, J. (1989). Educational Systems and Labor Market Outcomes. *European Sociological Review*, **5**, 231–250.
- Brzinsky-Fay, C., Kohler, U. and Luniak, M. (2006). Sequence Analysis Using Stata. *Stata Journal*, **6**, 435–460.
- Detzel, P. and Rubery, J. (2002). Employment Systems and Transitional Labour Markets: A Comparison of Youth Labour Markets in Germany, France and the UK. In Schmid, G. and Gazier, B. (Eds) *The Dynamics of Full Employment. Social Integration through Transitional Labour Markets*. Cheltenham/Northampton: Edward Elgar, pp. 106–148.
- Eurostat (2002). *Sample Attrition between Waves 1 and 4 in the European Community Household Panel*. Luxembourg: Eurostat (Doc PAN 185/02).
- Everitt, B. S., Landau, S. and Leese, M. (2001). *Cluster Analysis*. London: Arnold.
- Franz, W., Inkmann, J., Pohlmeier, W. and Zimmermann, V. (2000). Young and Out in Germany: On the Youths' Chances of Labor Market Entrance in Germany. In Blanchflower, D. G. and Freeman, R. B. (Eds) *Youth Employment and Joblessness in Advanced Countries*. Chicago: The University of Chicago Press, pp. 381–425.
- Gangl, M. (2002). Changing Labour Markets and Early Career Outcomes: Labour Market Entry in Europe over the Past Decade. *Work, Employment and Society*, **16**, 67–90.
- Gangl, M. (2003). The Structure of Labour Market Entry in Europe: A Typological Analysis. In Müller, W. and Gangl, M. (Eds) *Transitions from Education to Work in Europe*. Oxford: Oxford University Press, pp. 95–116.
- Gangl, M., Müller, W. and Raffe, D. (2003). Conclusions: Explaining Cross-National Differences in School-to-Work Transitions. In Müller, W. and Gangl, M. (Eds) *Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets*. Oxford: Oxford University Press, pp. 277–305.
- Halpin, B. (2003). *Tracks Through Time and Continuous Processes: Transitions, Sequences and Social Structure*. Paper presented at Frontiers in Social and Economic Mobility, Cornell University.
- Halpin, B. and Chan, T. W. (1998). Class Careers as Sequences: An Optimal Matching Analysis of Work-Life Histories. *European Sociological Review*, **14**, 111–130.
- Hannan, D. F., Raffe, D. and Smyth, E. (1997). *Cross-National Research on School to Work Transitions: An Analytical Framework*. Paper presented at 1996 Workshop of the Network on Transitions in Youth, La Ciotat.
- Hillmert, S. (2002). Labour Market Integration and Institutions: an Anglo-German Comparison. *Work, Employment and Society*, **16**, 675–701.
- Korpi, T., de Graaf, P., Hendrickx, J. and Layte, R. (2003). Vocational Training and Career Employment Precariousness in Great Britain, the Netherlands and Sweden. *Acta Sociologica*, **46**, 17–30.
- MacIndoe, H. and Abbott, A. (2004). Sequence Analysis and Optimal Matching Techniques for Social Science Data. In Hardy, M. and Bryman, A. (Eds) *Handbook of Data Analysis*. London/Thousand Oaks/New Delhi: Sage Publications, pp. 387–406.
- Marsden, D. (1999). *A Theory of Employment Systems. Micro-Foundations of Societal Diversity*. Oxford: Oxford University Press.
- McVicar, D. and Anyadike-Danes, M. (2002). Predicting Successful and Unsuccessful Transitions from School to Work by Using Sequence Methods. *Journal of the Royal Statistical Society*, **165**, 317–334.
- OECD (1998). *Employment Outlook*. Paris: OECD.

- OECD (2005). *Education at a Glance. OECD Indicators 2005*. Paris: OECD.
- Peracchi, F. (2002). The European Community Household Panel: A Review. *Empirical Economics*, 27, 63–90.
- Pollock, G., Antcliff, V. and Ralphs, R. (2002). Work Orders: Analysing Employment Histories Using Sequence Data. *Social Research Methodology*, 5, 90–105.
- Russell, H. and O’Connell, P. (2001). Getting a Job in Europe: The Transition from Unemployment to Work among Young People in Nine European Countries. *Work, Employment & Society*, 15, 1–24.
- Ryan, P. (1999). *The School-to-Work Transition: Issues for Further Investigation*. Paris: OECD.
- Sackmann, R. and Wingens, M. (2003). From Transitions to Trajectories. Sequence Types. In Heinz, W. R. (Ed.) *Social Dynamics of the Life Course. Transitions, Institutions, and Interrelations*. New York: Aldine de Gruyter, pp. 93–115.
- Scherer, S. (2001). Early Career Patterns: A Comparison of Great Britain and West Germany. *European Sociological Review*, 17, 119–144.
- Scherer, S. (2005). Patterns of Labour Market Entry - Long Wait or Career Instability? An Empirical Comparison of Italy, Great Britain and West Germany. *European Sociological Review*, 21, 427–440.
- Schmid, G. (1998). *Transitional Labour Markets: A New European Employment Strategy*. Discussion Paper FSI 98-206, Berlin: Wissenschaftszentrum Berlin für Sozialforschung (WZB).
- Shavit, Y. and Müller, W. (Eds) (1998). *From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations*. Oxford: Clarendon Press.

Author’s Address

Christian Brzinsky-Fay, Social Science Research Center Berlin (WZB), Research Unit Labour Market Policy & Employment, Reichpietschufer 50, 10785 Berlin, Germany. Email: brzinsky-fay@wzb.eu

Manuscript received: August 2006

11. Get the Balance Right: Risk and Flexibility in School-to-Work Transition Sequences

Christian Brzinsky-Fay

11.1 INTRODUCTION

Many European countries have active labour market policies that aim either to integrate school leavers into the labour market or to keep young people at work. In most cases, these policies are targeted at certain problem groups that face higher risks of labour market exclusion – migrants and early school leavers are typical examples. These groups need help in particular situations, such as when they are looking for an apprenticeship or a job. But any focus on labour market transitions must look not only at single situations or status changes, but also at changes over the longer period, that is, at sequences of transitions. For example, a single change from unemployment to employment does not really provide much information about the integrative or risk character of the whole process of labour market entry. To assess this process properly, it is essential to extend the observation window and consider more than just one transition at a time.

The objective of this chapter is to identify different types of school-to-work transition sequences in ten European countries by using the methods of optimal matching and cluster analysis. Such an approach requires access to comparative longitudinal data, which in this case is provided by the monthly labour market status information contained in the European Community Household Panel (ECHP). As regards the risks inherent in the process of labour market entry, the school-to-work transition should provide an adequate amount of security (in terms of future employment prospects or income) and at the same time should allow for sufficient flexibility (in terms of training opportunities and adjustment to individual desires and market requirements). In order to assess the observed transition types in terms of how they balance flexibility and security, indicators of volatility and

integrative potential are constructed. We then examine how the attributes of gender, education, migration background and country determine the probability of passing through a certain type of transition sequence. For this purpose, a multinomial logit model is estimated. The following questions will be addressed in this chapter: Which types of labour market status sequences have low or high integrative potential? Are volatile transitions associated with a high risk of labour market exclusion? How are certain labour market entry sequences distributed across countries or transition regimes? Which groups of young people are associated with certain sequence types on the labour market?

Sociological research is still interested in the form and the process of school-to-work transitions and in labour market integration. Because the school-to-work transition is a critical period that has a major influence on the opportunities that will be available during the further course of the employment career, it deserves further attention. The interesting question here is whether there are distinct chains of statuses that reflect deterministic pathways on the way from school to work. There are a number of determinants at the individual level that influence the transitions of school leavers into the labour market. In fact, identifying the target groups that could be helped by policies is not difficult, but formulating policies that respond to the transition problems these people have to face appears to be more complicated.

One reason is that by far most of the risk analyses dealing with problem groups of young people only refer either to static status distributions, for which cross-sectional data are used, or to single transitions such as unemployment risks, using event history models. Both methods have disadvantages. In the first case, the causal effect is not given, because when two or more pieces of cross-sectional information are used, then the data concerns different individuals and so only the aggregate information is usable. In the second case, we can indeed estimate comprehensive causal models, but these become inaccurate as the number of events increases (Halpin, 2003). Overall, then, there is a lack of research examining the school-to-work transition as a *period* that involves more than one single transition between education and employment or between education and unemployment (Hillmert, 2002: 676).

The link between the macro and the micro levels is an enduring and substantial problem in the social sciences in general, and this is particularly true for the life-course approach. Here, the difficulty is reflected by the gap between the two empirical concepts of 'transition' and 'trajectory'. It is not really possible to identify a causal relationship between a trajectory offered by institutions or policies, on the one hand, and an individual decision to undertake a certain transition, on the other. With the sequence concept,

however, it is possible to look at periods containing a large number of transitions and to categorise these periods in groups that can be taken as ideal types, which in turn can be associated with individual and/or institutional factors. From the policy perspective, the linking of transition types to individual socioeconomic factors enables policy-makers to improve their policies, focus better on target groups and develop more process-oriented rather than situation-fixed measures (McVicar and Anyadike-Danes, 2002).

This chapter describes an explorative analysis of labour market entry sequences consisting of 60 consecutive monthly labour market statuses (Brzinsky-Fay, 2007). The resulting classification of labour market entry sequences is then subjected to a causal analysis that attributes the fact that an individual experiences a certain type of transition sequence to variables such as gender, education, migration background and country. After outlining the theoretical framework (section 11.2) and describing the methodology in more detail (section 11.3), the explorative part of the work is carried out by applying optimal matching together with cluster analysis, while the causal analysis is based on the estimation of a multinomial logit model (section 11.4). Finally, conclusions are drawn and policy implications are discussed (section 11.5).

11.2 THEORETICAL FRAMEWORK

11.2.1 Research Review

The most important individual factor with respect to the process of labour market integration is level of education. Though young women and those with a migration background can be particularly disadvantaged, it is still the educational careers and qualifications of young people that have the strongest impact on their employment prospects and occupational status (Gangl, Müller and Raffe, 2003). Otherwise, family background also seems to play a role in determining the course of the school-to-work transition (McVicar and Anyadike-Danes, 2002).

Country differences and the impact of institutions on the school-to-work transition have been the object of investigation in a number of research studies. The dual system of apprenticeship was the first focus of those efforts (see Blossfeld, 1992; Korpi, de Graaf, Hendrickx and Layte, 2003; Tremblay and le Bot, 2003; Wagner, 1998). Institutional factors have also been considered in research studies, though to a lesser extent. These factors are, first, the structure of the education system; second, the structure of the labour market; third, the regulation of the labour market, including employment protection and collective bargaining; and, fourth, active labour market policies, which are said to be becoming increasingly institutionalised and to

constitute an important aspect of school-to-work transitions (Müller and Gangl, 2003). From the institutional perspective, Gangl et al. (2003) found that there are three configurations of education systems in Europe: countries with extensive vocational training at secondary level; countries with predominantly general education at secondary level; and countries with a low level of educational attainment.

The theoretical foundations of the empirical analysis of labour market sequences have been developed through sociological life-course research (see Sackmann and Wiggins, 2003). The sequence concept connects the macro level, represented by the concept of trajectories, and the micro level, represented by single transitions. A trajectory can be seen as a pathway offered by the institutional configuration in a particular country. Of course, there is more than one possible trajectory in every country, because (vocational) education systems are designed for different professions and different skill levels. A transition is simply a change in an individual's labour market status. This can be the transition from employment to unemployment or from education to employment after finishing school. A sequence is defined as 'any life-course movement that includes at least two transitions between states (in a given state space)' (Sackmann and Wiggins, 2003). Within the framework of this concept, and in an effort to capture policy-relevant forms of sequences, we now construct a group of different theoretical sequence types. These theoretical types are to a certain extent derived from empirical data, namely the European Community Household Panel (ECHP). More precisely, eight distinct transition types were isolated from data relating to more than 3,000 school leavers, where the data included the monthly labour market status of each individual over a five-year period (Brzinsky-Fay, 2007).

The more normative aspect of favourable school-to-work transitions was investigated by concentrating on particular properties of transition sequences: volatility and integrative capability. The volatility of a transition sequence can have positive or negative effects per se, depending on the respective statuses of individuals who are undergoing change. In this respect, it is argued that the major problem regarding the labour market integration of young people is their lack of work experience and the lack of information about their vocational qualifications. This circumstance inhibits potential employers from hiring inexperienced young people. The amount of information generally increases for both employers and employees when young people participate in further education, an apprenticeship or a combination of the two. Hence, these statuses reflect a comparatively positive volatility, whereas episodes of unemployment and inactivity can be regarded as negative volatility. Transition types that have several transitions between education, employment and apprenticeship were found in countries with a well-developed system of further training, such as Denmark, or with an established apprentice-

ship system, such as Germany. On the other hand, transition types with negative volatility were predominant in countries with a low degree of institutional coordination between the education system and the labour market, such as the southern European countries (Brzinsky-Fay, 2007). The integrative capability of a transition type is a measure of how quickly and to what extent young people are integrated into the labour market. Because of the standardised length of the sequences examined here, this property can be assessed only by looking at the share of people who become employed during the observation period. Because integration means that employment should be the final goal of the process, a stronger weight is given to later employment spells. Transition types with low integrative capability were mainly found in the southern European countries, whereas transition types with a high level of integrative capability predominate in the United Kingdom. Germany shows a medium level of integrative capability (Brzinsky-Fay, 2007).

From a policy perspective, the concept of transitional labour markets (TLMs) serves as the theoretical background for the analysis of labour market sequences (Schmid, 1998, 2002; Schmid and Schömann, 2004). Proceeding on the basis of the consideration that globalisation, technological progress and individualisation create an increasing demand for flexibility, and that at the same time social security must be ensured, this concept encourages the take-up of labour market transitions through institutional regulations and policies that safeguard and motivate both employers and employees. These institutions are called 'transitional labour markets' and are located at crucial points on the labour market, such as the transition between the education system and employment. To ascertain in what way TLMs need to be configured, it is essential to know the empirical shape that transition sequences take. When applying the TLM concept, one differentiates between integrative, maintenance and exclusionary transitions (O'Reilly, Cebrián and Lallement, 2000), and risk management becomes an important concern (Schmid, 2006). This refers to changing risk types with respect to the life course. Traditionally, the main risk in the transition from school to work was to gain access to a particular job in a more or less straightforward manner. In modern societies, the variety of possible pathways to work is increasing together with the possibility of wrong decisions leading into dead-end streets. At the same time, the whole process of school-to-work transitions is becoming destandardised and more than just a single choice may account for failure. Hence, the aim of this chapter is to look at the school-to-work transition as a whole in order to identify regularities and assess their quality regarding flexibility and security, which are measured by indicators derived from the TLM concept, namely volatility and integrative capability.

11.2.2 Hypotheses

As mentioned above, it is clear that the institutions of individual countries offer more than just one trajectory because a (vocational) education system has to achieve coordination between the heterogeneous skills of young people and the demands of different professions. This is also reflected in the transition sequence types of each country. But the broad variation of institutional configurations between countries leads to each sequence type exhibiting different weights in each country. And not only country characteristics determine individuals' transition probabilities, but also individual characteristics such as gender, education and migration background.

Regarding the effect of education on sequence type, it can be expected that a higher level of education will have a positive effect on the type of transition made by an individual. This means that school leavers with a higher ISCED level have a higher probability of entering the labour market via a transition type with high integrative capability and high volatility and vice versa.

Hypothesis 1

Young people with a high educational level will have higher probabilities of passing through a sequence type with high integrative capability and/or high volatility.

The opposite relation can be assumed for migration background. School leavers with a migration background will have a higher probability of passing through a sequence type with low integrative potential and/or low volatility.

Hypothesis 2

Young people with a migration background will have lower probabilities of passing through a sequence type with high integrative capability and/or high volatility.

Regarding gender, there is no clear-cut theoretical reason why women should have different probabilities of entering the labour market via a certain transition type, apart from the fact that women are usually more frequently inactive because of family responsibilities.

Hypothesis 3

Apart from more frequent incidences of inactivity among women, no gender differences are assumed regarding types of school-to-work transitions.

Because of the differences found in institutions, policies and economic situations, country differences are expected to be significant, at least to the

extent that particular transition types appear in particular countries (Brzinsky-Fay, 2007). The southern European countries are characterised by a lower level of both educational attainment and vocational education. School leavers in these countries are expected to have high probabilities of passing through 'bad' transition types and, at the same time, they will show lower probabilities for 'good' transition types. The opposite will be true for countries with mainly general qualifications or extensive vocational training systems.

Hypothesis 4

School leavers from countries with lower levels of educational attainment have a higher probability of bad transition types than those from countries with general education or extensive vocation education.

11.3 DATA AND METHODS

The European Community Household Panel (ECHP) is the only comparative panel data set available on socioeconomic issues. It is a longitudinal data set that was built up by Eurostat and the national statistics offices of the member states of the European Union from 1994 to 2001. It contains a large variety of variables covering a number of socioeconomic issues at both the individual and household levels.¹ According to previous research (see Franz, Inkmann, Pohlmeier and Zimmermann, 2000; Gangl, 2003; Russell and O'Connell, 2001), the most important individual factors with respect to the labour market integration of young people are gender, educational attainment and migration background, which are all included in the survey.

For this study, five countries could not be analysed on technical grounds. Only cross-sectional data are available for Sweden, while it was not possible to examine transition types for the Netherlands because there are only missing values in the calendar variables. Luxembourg, Austria and Finland also had to be excluded on the grounds of too few valid cases.

Brzinsky-Fay (2007) defines the beginning of school-to-work transitions as the point at which young people leave full-time general education. Hence, apprenticeships are included in the observation window and are not considered part of the initial education. One reason is that an apprenticeship is a form of qualification that is specifically related to a particular vocation, so that it should be viewed as belonging to the domain of employment, even if participants in apprenticeships spend a large amount of their time at school.² Another reason to distinguish apprenticeships from initial education is the crucial role that work experience plays in obtaining a job. Work experience is provided by a job as well as by vocational training such as an apprenticeship, but not by a general education. Furthermore, in order to

identify the relevance of apprenticeships for school-to-work transitions, it is necessary to examine the weight that they have within the transition period. In the interests of having a comparable framework, the observation window is defined equally for all countries, namely 60 months (5 years).

The calendar data used to extract transition types are retrospective and contain information from January 1993 to December 2000, which amounts to 96 months.³ The categories of the monthly calendar variables for 'labour market status' are 'employed', 'unemployed', 'apprenticeship', 'inactive/house hold' and 'education'. Employed persons are those who are either self-employed or in dependent employment, while inactivity includes housework, family care and military service. The status of 'education' includes both university education and further education.

The two indicators constructed from the sequence data that capture the integrative potential and the volatility of the labour market entry sequences can be taken as quality measures of school-to-work transitions. The integration indicator was created after the types of sequences had been derived and simply gives the total months of employment, which are weighted by their position in the sequence. The later the employment episodes are located, the stronger is their weight. Thus, later employment episodes are regarded as more important because of the sequential character of the data. Earlier employment episodes only maintain their relative value if they are related in some way to later employment episodes. The volatility indicator gives the mathematical share of the number of episodes in employment, education and apprenticeship, as well as the overall number of episodes. The higher the value of this indicator, the more favourable are sequences with respect to flexibility in the particular country. One advantage of this indicator is that it is independent of the overall level of episode changes because it only reflects the relationship between two kinds of episodes. Both indicators are calculated at the individual level and summarised at the cluster level. The integration indicator can be seen as a measure of transition risk because it depends to a great extent on employment opportunities following the end of the observation period. The volatility indicator reflects some kind of favourable flexibility with regard to labour market changes.

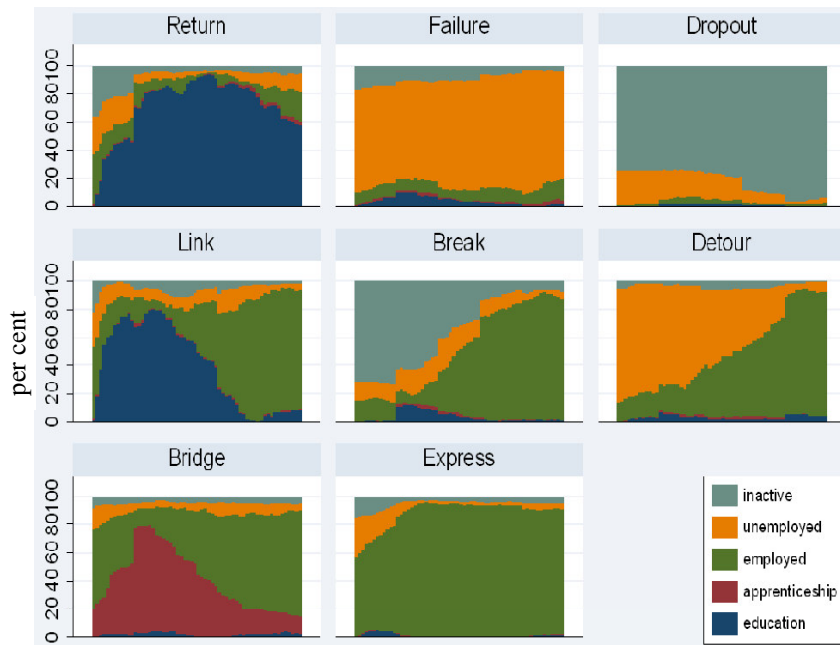
The analysis is carried out in two parts. First, a description is given of the different transition types, which were found by calculating the differences between monthly labour market status sequences and then grouping similar sequences together.⁴ Then the clusters of sequence types are associated with the individual characteristics listed above as independent variables in a multinomial logit model.

11.4 TRANSITIONS SEQUENCES FROM SCHOOL TO WORK

11.4.1 Clusters of Labour Market Entry Sequences

The cluster analysis was carried out using only the second of two steps, with the first step (the calculation of a dissimilarity measure) being replaced by the optimal matching algorithm. For the second step (the fusion of groups), the classic Ward linkage algorithm was used. When operating with a hierarchical fusion algorithm, a decision has to be made on the crucial question of the appropriate number of clusters. For contextual and practical reasons, in this case an eight-cluster solution was chosen.⁵

To get a general picture of the clusters, the monthly proportion of statuses is shown in Figure 11.1.



Source: ECHP, own calculations; (c) WZB, C. Brzinsky-Fay.

Figure 11.1 Monthly proportion of statuses by cluster

It must be pointed out that this figure does not show individuals' sequences, rather only the share of monthly statuses. In the first cluster, at the beginning

of the observation period around 40 per cent of school leavers are employed, 40 per cent are inactive and 20 per cent are unemployed. These numbers decrease sharply in the first year and the share of education remains at a very high level throughout the entire five-year period. According to the sequence typology developed by Sackmann and Wingens (2003), this cluster is primarily built on return-type sequences and therefore can be called the return cluster. Reasons for returning to education can be escape from unemployment (Scherer, 2001: 135) or so-called waiting loops, whereby young people take up work only as an interlude between general and higher education. Unemployment is the primary labour market status in the second cluster, and it is spread more or less evenly across all five years. That is why this cluster can rightly be called the failure cluster. The only difference between the failure cluster and the third cluster is that in the latter, inactivity is the most important status. There is a 25 per cent share of unemployment at the beginning of this cluster, but this disappears over the course of the observation period. Because inactive people are by definition outside the labour market, the third cluster can be labelled the dropout cluster. The failure and the dropout clusters correspond to rupture and change in Sackmann and Wingens' typology. The fourth cluster includes a good share of education, as well as a considerable share of employment. Because education is concentrated at the beginning and employment at the end of the observation period, it can be assumed that education has a linking function in these sequences. Thus, this cluster can be called the link cluster. The difference between the link and the return cluster is that in the latter, the education episodes are spread across the whole observation period, whereas in the former most of them come to an end after three years. The fifth cluster shows much inactivity at the beginning and a lot of employment at the end. Most of the sequences lead to employment and thus to integration into the labour market. Because the people in this cluster are completely outside of the workforce in the initial years following school-leaving for whatever reason, this sequence type will be named the break cluster. We find a very similar structure in the sixth cluster, where we only have employment at the beginning instead of inactivity. In this cluster, moreover, 90 per cent of the school leavers are employed after five years. Because most of the unemployment episodes are located at the beginning and because the unemployed belong to the workforce, this sequence type is labelled detour. A good portion of the school-to-work transitions that include apprenticeships are grouped in the seventh cluster, which also contains a lot of employment and, therefore, reflects perfectly what Sackmann and Wingens describe as the bridge type. In other words, the aspired status of employment is reached from the starting point of education via a hybrid status, and this type of sequence is therefore called the bridge cluster. Sequences with a major share of

employment are pooled in the last cluster. Employment episodes are found from the very beginning in this cluster, which can therefore be called the express cluster because it contains all the individuals who are integrated into the labour market very rapidly.

In order to construct indicators for a quantitative distinction between the clusters, the durations of statuses, the average number of episodes and the two indicators for integrative potential and volatility are extracted for the respective clusters, as shown in Table 11.1.

Table 11.1 Characteristics of clusters

		Cluster							
		Return	Failure	Dropout	Link	Break	Detour	Bridge	Express
Average duration in...	education	42.5	2.4	0.5	23.9	2.4	2.2	1.7	1.1
	apprenticeship	0.8	0.8	0.1	0.4	0.5	0.6	22.9	0.1
	employment	6.2	5.5	1.5	26.6	28.0	26.8	28.6	52.0
	unemployment	5.5	46.1	8.7	5.9	7.2	28.3	4.2	4.0
	inactivity	4.9	5.2	49.2	3.2	21.8	2.0	2.5	2.8
Average number of episodes in...	education	1.7	0.3	0.1	1.6	0.3	0.3	0.2	0.2
	apprenticeship	0.1	0.1	0.0	0.1	0.1	0.1	1.1	0.0
	employment	1.3	0.9	0.2	2.3	1.6	2.0	1.9	1.5
	unemployment	0.7	2.0	0.5	1.0	1.0	2.1	0.7	0.7
	inactivity	0.6	0.5	1.3	0.7	1.4	0.3	0.3	0.4
Integration indicator		9.4	9.6	2.4	59.2	63.8	59.2	55.8	90.6
Volatility indicator		65.4	24.2	6.1	72.0	45.4	50.2	79.8	70.9
N		347	625	586	164	314	465	299	1,217

Source: ECHP, own calculations.

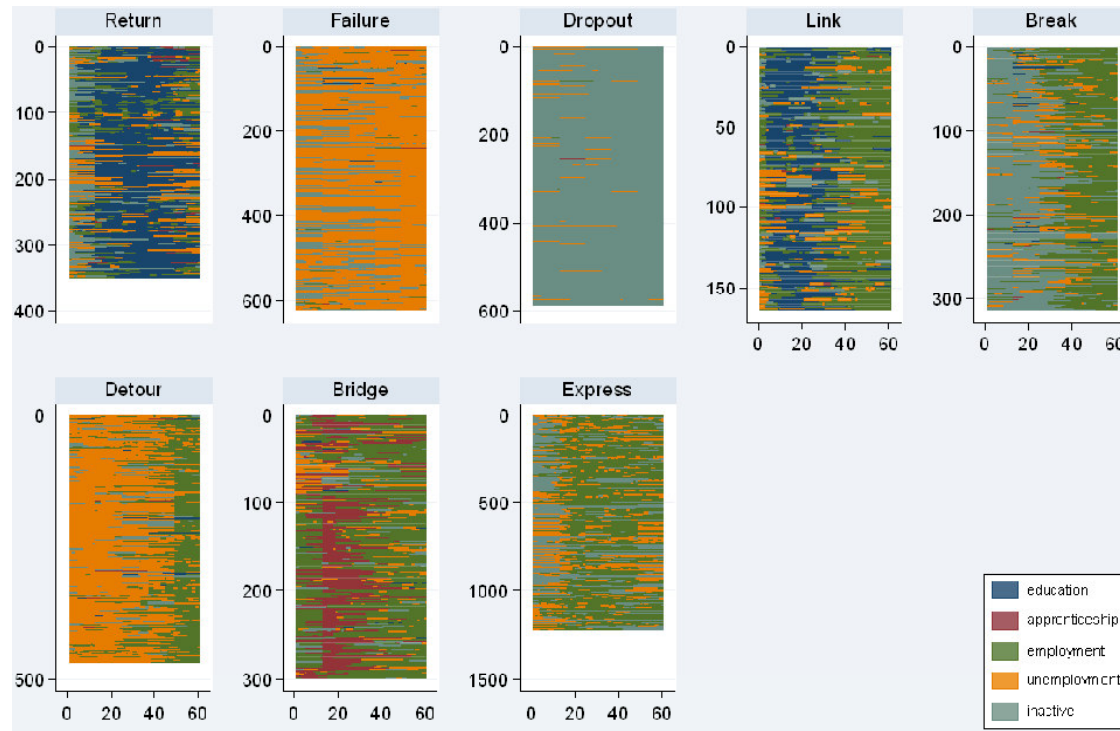
The transition sequences of the 347 individuals found in the return cluster are characterised by the status of education, which on average accounts for 42.5 months of the 60 months following the end of school education. The volatility of this cluster is at an average level, whereas the integration indicator shows a low level of integrative potential. This is due to the fact that this cluster contains university students, who naturally need a longer time to integrate into the labour market. Unemployment and inactivity constitute the most important statuses in the failure and the dropout clusters. The former contains slightly more months spent in education, apprenticeship and employment than the latter. Both clusters have low volatility and integration values, but the dropout cluster is both less integrative and less volatile than the failure cluster. The link cluster created by the algorithm consists mainly of education and employment months. The level of volatility is the second

highest of all the clusters and the integrative potential is at a medium level. With only 164 cases, this is the smallest of all the clusters.

The break cluster is composed of 28 months of employment and 21.8 months of inactivity and has a medium integrative potential as well as a medium level of volatility. Employment and unemployment are the most important statuses in the detour cluster, by contrast. As in the break cluster, the integration and volatility indicators show medium values here. The bridge cluster is the only cluster that mainly contains apprenticeship statuses, while employment also has a high weight in this cluster. The level of volatility is the highest of all the clusters here, whereas the integrative potential is at a medium level. In the express cluster, employment is by far the most important status: the school leavers in this cluster are employed on average for 52 out of 60 months. Thus, here we find the highest value for the integration indicator and the third-highest value for volatility. The express cluster is the largest among the eight clusters, accounting for 1,217 individuals.

To examine the sequential character of the transition process, it is necessary to look at the graphical display of individual sequences by cluster (Figure 11.2). This step verifies the conclusions drawn from the monthly proportions and gives an impression of the complexity of transition sequences. Individuals in the return cluster frequently start with an episode of employment, unemployment or inactivity lasting roughly one year, and after that they return to education for the rest of the observation period. There are some sporadic interruptions, which in some cases can be interpreted as student summer employment, but a major change of status rarely occurs.

The sequence index plot of the failure cluster shows a predominance of unemployment, which is conspicuously spread across the entire period. Only a very small share of the people in this cluster are employed at the end of the transition period. The same is true for the dropout cluster, but instead of unemployment, this cluster is characterised by inactivity. The linking function of education statuses in the link cluster is obvious: the education periods are clearly short, so that the majority of school leavers enter employment after two or three years. The break and the detour cluster, together with the link cluster, represent long-term successful integration processes, each of them with a different entrance status. It is noteworthy that the values of their integration indicators are at similar levels, while they differ in volatility. The bridge cluster shows the bridging function of apprenticeships, but also reveals that it is not always the case that young people immediately find employment after finishing an apprenticeship. The bridge cluster is also the second-smallest cluster. Sequences from the express cluster rarely start with unemployment and are seldom interrupted by any other status, so that they nearly always terminate in employment.



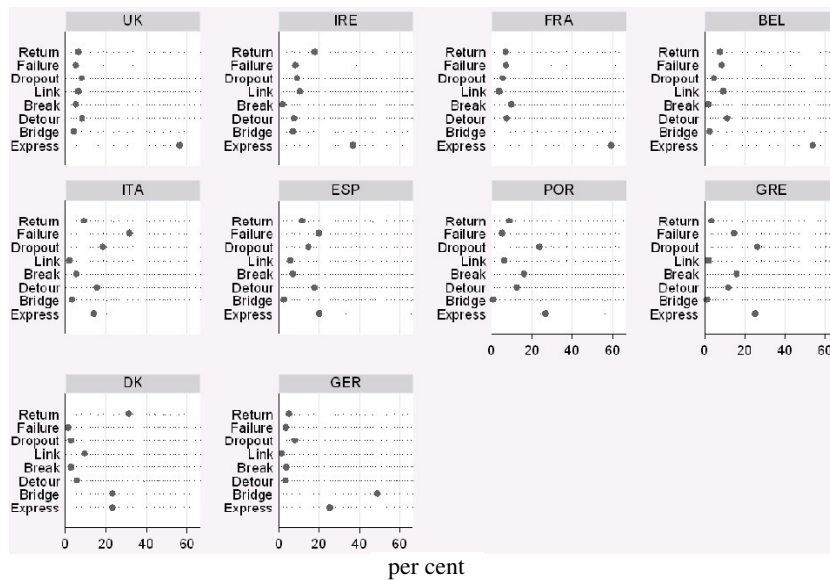
Source: ECHP, own calculations (cp. Brzinsky-Fay, 2007); <www.wzb.eu/~brzinsky-fay/get_the_balance_right.en.htm>.

Figure 11.2 Sequence index plots by cluster

To summarise, there are distinct types of transition sequences that show explicit differences in the proportion and order of labour market statuses as well as in their integrative potential and volatility. What is important for institutional comparison is the question as to whether or not these clusters are country specific, and this question will be examined in the following subsection.

As Figure 11.3 shows, the incidence of the different clusters varies substantially across countries. With the exception of the bridge cluster, for which no cases could be found in France, all remaining clusters appear in all countries.

Figure 11.3 Incidence of sequence types in countries



Source: ECHP, own calculations (cp. Brzinsky-Fay, 2007);
www.wzb.eu/~brzinsky-fay/get_the_balance_right.en.htm.

Transition sequences from the return cluster are found by far most frequently in Denmark, but transition sequences of this type also play an important role in Ireland and Spain. The link cluster appears, in particular, in Ireland, Denmark and Belgium. The bridge cluster is very common in Germany and Denmark, where apprenticeship systems exist. In Germany, nearly 50 per cent of all school leavers enter transition sequences of this type, compared to almost 25 per cent in Denmark. An outstanding share of express sequences is found in France, the United Kingdom and Belgium, where between 50 per cent and 60 per cent of school leavers belong to this cluster. The highest

share of detour sequences can be found in the southern European countries and in Belgium. Portugal and Greece show the highest shares of break sequences. The failure and the dropout clusters show up most often in the southern European countries of Spain, Italy and Greece and – to a lesser extent – in Portugal. In Italy, more than 50 per cent of all transition sequences belong to these two clusters, while the share is 40.7 per cent in Greece and 35 per cent in Spain. The lowest proportion of failure and dropout sequences can be found in Denmark.

To sum up, the distribution of sequence types across countries shows that the most country-specific transition sequences are the bridge type for Germany and – to a lesser extent – for Denmark, the failure and dropout type for the southern European countries, and the link type for Denmark and Ireland. The express cluster is spread across all countries, although its size varies considerably. The sequences of the link, the detour and the break type are distributed most evenly across the countries under observation and at the same time they to some extent reflect the general trend of destandardisation of life courses.

11.4.2 Individual Characteristics and Transition Sequences

One of the most interesting questions remaining now is how socioeconomic characteristics determine the probability of belonging to a certain transition sequence type? To assess this probability, we estimate a multinomial logit model that includes the independent variables of gender, educational level (at the beginning of the transition period) and migration background.⁶ Country dummies are added to control for national influences. The results are shown in Table 11.2.

Surprisingly, the pseudo- R^2 for the overall fit of the model is quite low, which means that apart from the three predictor variables used here, there must be other important, unobserved influencing factors that determine the labour market entry sequence. However, most of the coefficients are significant. The coefficients are expressed as relative risk ratios, whereas values between 0 and 1 are calculated as negative reciprocals in the interests of interpretative clarity. In addition, the coefficients must be interpreted relative to the express cluster, which is defined as the base outcome because it represents the most favourable labour market entry sequence type. Thus, women are six times more likely than men to be in the dropout cluster than in the express cluster. At the same time, women are 1.3 times less likely to be in the break cluster.

Table 11.2 Multinomial logit model (relative risk ratios)

Cluster	Educational level			Country									
	medium	high	non-nationals	women	BEL	FRA	IRE	ITA	GRE	ESP	POR	GER	UK
Return	4.20 ***	2.74 ***	n.s.	n.s.	-21.55 ***	-20.51 ***	-6.71 ***	-5.62 ***	-25.14 ***	-4.97 ***	-8.27 ***	-13.45 ***	-28.78 ***
Failure	-2.69 ***	-4.77 ***	n.s.	1.44 ***	-2.75 ***	-5.18 ***	-2.55 ***	4.03 ***	n.s.	1.68 ***	-4.15 ***	-4.30 ***	-5.12 ***
Dropout	-7.99 ***	-22.60 ***	3.56 ***	6.32 ***	-9.51 ***	-15.36 ***	-4.23 ***	1.56 ***	n.s.	-1.56 **	-2.42 ***	-11.16 ***	-5.82 ***
Link	1.54 *	2.16 ***	n.s.	n.s.	-10.00 ***	-25.93 ***	-5.23 ***	-11.09 ***	-20.85 ***	-5.40 ***	-5.45 ***	-18.40 ***	-15.34 ***
Break	-2.10 ***	-2.43 ***	n.s.	-1.36 **	-11.72 ***	-3.50 ***	-9.04 ***	n.s.	n.s.	-1.51 *	n.s.	-2.93 ***	-4.99 ***
Detour	-1.55 ***	-2.19 ***	2.11 *	n.s.	-3.17 ***	-6.14 ***	-3.54 ***	1.45 **	-1.55 **	n.s.	-1.89 ***	-9.23 ***	-4.39 ***
Bridge	1.40 *	-2.45 ***	-2.22 ***	1.04	-16.70 ***	n.s.	-5.38 ***	-5.02 ***	-28.75 ***	-7.21 ***	-45.20 ***	2.06 ***	-10.41 ***
N	4,005												
Pseudo R ²	0.24												

Notes:

The coefficients are relative risk ratios. For values between 0 and 1 the reciprocal is calculated, because of interpretative cleanness.

Express is the base outcome, reference categories: Denmark & low level of education. Significance levels: *** p = <0.01; **p = <0.05; * p = <0.1.

Source: ECHP, own calculations.

If we bear in mind that both clusters include spells of inactivity, and that these are longer in the dropout cluster, then we must conclude that starting the transition period with inactivity is much riskier for female than for male school leavers. This can be explained by the childcare periods young women go through in this age group. In addition, young women have a higher probability of starting with a labour market entry sequence of the failure type than men. For people with a migration background, the probability of belonging to a sequence of the dropout type is 3.5 times higher than for natives. Migrants also have a higher probability of entering detour sequences and a 2.2-times lower likelihood of starting their labour market career with a bridge sequence type, which means that apprenticeships fail to integrate immigrants.

The factor of educational level clearly shows the correlation between qualification and labour market outcome: the higher the level of education, the higher the probability of entering the labour market in a favourable way. This is in line with human capital theory, which implies that a high educational level increases the chances of obtaining a favourable position in the labour market. The effect is most obvious in the dropout cluster: the chance of school leavers with a medium level of education belonging to this cluster is 8 times lower than for those with a low educational level, while for those with high level of education, the chance is a hefty 22.6 times lower. Looking at the link and the return clusters, we find that education is a cumulative property, which means that those who are already educated are more likely to receive additional education than those who are not educated to begin with. In the return and the link clusters, the probabilities of undergoing further education are higher for those with medium- and high-level educations than for less educated school leavers. The lower educated also have higher probabilities of being found in the failure, break and detour clusters. The situation is different with respect to the bridge cluster because school leavers with a medium level of education have higher probabilities of belonging here than those with a high level of education. This reflects the fact that apprenticeships – the main component of this cluster – are created for people with a medium level of education.

The coefficients of the country dummies are highly significant in most of the cases and their values are higher than those of the other covariates. Thus, it can be stated that institutional factors are more important for the labour market entry sequences than socioeconomic characteristics. On the basis of these coefficients, we can also identify country-specific sequence types. The reference category here is Denmark and the coefficients again indicate the probability of having a certain sequence type relative to the express cluster. The return cluster, for example, seems to be very typical for Denmark, given that the coefficients for all the other countries are clearly smaller. This can be

seen as a consequence of Denmark's well-established systems of higher and further education. The failure cluster is typical for Italy, Greece and Spain: the coefficients in these three countries are positive, which means that their residents have a probability ranging from 1 (Greece) to 4 times (Italy) higher of having a labour market entry sequence from the failure type. These three countries are characterised by an absence of institutional regulations and policies regarding the integration of school leavers into the labour market. The lowest probabilities for the failure cluster can be found in the United Kingdom and in France. It can be assumed that young people in the United Kingdom find work quickly because of this country's liberal labour market and the high income differences found there, which indicate the possibility of low entry wages. In France, where young people are also more likely to enter the labour market according to the express sequence type than to the failure sequence type, the existence of mainly internal labour markets explains the low probability of failure. But it can be assumed that the stigmatising effect on those who once experienced this transition type is high, which is reflected by the low probabilities of belonging to the break, detour and return clusters. A quite similar picture emerges for the dropout cluster, with the values for France and Germany being more extreme, while again the southern European countries – and particularly the women living in southern Europe – have the highest probabilities of belonging to the dropout cluster. Sequences of the link type also seem to be typical in Denmark, again indicated by the fact that all the other countries have smaller values. And once again this is evidence of the institutional effect of Denmark's well-established education and training systems. As mentioned above, the probability of having a link-type labour market entry sequence is very low in France because of its internal labour markets. The break and the detour cluster seem to be the most unspecific types, given that the coefficients are small in every country. The probability of having a labour market entry sequence of the bridge type is highest in Germany because of this country's dual system of apprenticeship. Germany remains the only country where this probability is higher than the probability of belonging to the express cluster, so the bridge cluster is very typical for Germany.

11.5 CONCLUSIONS

The sequence concept has a number of advantages. First, it enables a link to be made between the macro and the micro levels. Second, it is able to reduce the complexity of information generated by the huge number of theoretically possible sequences, while neglecting short and unimportant episodes and emphasising crucial transitions. And, third, it allows us to incorporate the

sequential information into causal models. These advantages mean that the method lends itself to studies of transition processes. Additionally, active labour market policies that aim to support the integration of young people into the labour market and that are targeted at specific problem groups can be improved by using sequence information. Taking into account both institutional peculiarities and individual characteristics, the probability of belonging to a certain labour market entry sequence can be used to better fit policies to the expected needs of school leavers.

The explorative analysis – i.e., optimal matching in conjunction with cluster analyses – reveals eight distinct types of school-to-work transitions that differ in terms of volatility and integrative potential. The transition types are distributed very unevenly across countries but, with the exception of the bridge type, all of them appear in every country. The clear differences in the distribution of all transition types across countries indicate that national institutional configurations have a strong influence. This is particularly true for the southern European countries, which show a high degree of similarity. The most country-specific transition types are the bridge cluster for Germany, the return and link clusters for Denmark, and the failure and dropout clusters for the southern European countries. Germany has a very well-established initial vocational training system, while Denmark boasts a well-established further training system (OECD, 2005).

The regression of gender, educational level, migration background and country on the transition types confirms that the impact of individual factors on the transition types is weaker than that of the country dummies, which also leads to the conclusion that institutional differences are more relevant. Among the individual variables, education seems to be the most important one and to have a positive effect on the probability of belonging to the link, return or express cluster. The education effect on the bridge cluster is only positive for the medium level of education; however, these school leavers are by definition the target group of apprenticeships. At the same time, the probability of having a labour market entry sequence of the dropout or failure type decreases with increasing level of education. Thus, Hypothesis 1 is confirmed. The effect of a migration background is only significant for the dropout cluster (which has the lowest value for volatility and integrative capability), for the bridge cluster and for the detour cluster. In all of these three cases, the coefficients show the expected effect, so that Hypothesis 2 is also confirmed. The gender effect is only significant in three cases, one of which is the dropout cluster. This confirms Hypothesis 3, because this cluster contains most of the inactivity spells. However, to get a full picture of what determines the labour market entry sequence of school leavers, other variables – apart from gender, educational level and migration background – need to be included. Other factors might be family background or regional

labour market conditions, but up to now there is no comparative panel data set that includes all of these variables.

Denmark and Germany appear to have favourable institutional configurations. In both countries, the share of transition types with the highest volatility – return, link, bridge and express clusters – is higher than 80 per cent. The share of transition types with a high integrative capability – first and foremost, the express cluster, but also the break, detour, link and bridge clusters – is lowest in those countries that have a lower level of educational attainment, so that Hypothesis 4 is confirmed. These countries are the southern European countries, which constitute a more or less homogeneous group with respect to school-to-work transition sequences. Their transition systems urgently need to be upgraded and/or advanced by policies. This is particularly important because the trend towards individualisation is diminishing the reparative function of the family. Denmark in some way constitutes a best practice example thanks to its established initial and further training system, which helps even bad starts to turn out positively.

From these findings two lessons can be drawn for the design of flexicurity policies. First, we found that there are clear effects of socioeconomic characteristics on the probability of passing through a certain labour market entry sequence. If these findings can be refined – e.g. by including more variables – targeted active labour market policies can be applied to particular groups of school leavers (cp. McVicar and Anyadike-Danes, 2002: 332) in order to establish a proactive early detection system of labour market risks. Second, it shows up that those systems exhibit the highest shares of favourable entry sequences, which distribute labour market entry risks between many levels – i.e. individual, enterprise, state – as well as having a strong emphasis on (further or vocational) education. This refers to Denmark, Ireland and Germany, whereas in the United Kingdom, which also performs well, the very fast labour market integration is reached at the expense of low quality jobs. Hence, flexicurity policies are of great value for early detection, if they consider educational matters and distribute risks on many shoulders.

NOTES

1. For a description and critique of the ECHP, see Peracchi (2002).
2. Apprenticeship spells are defined as ‘paid apprenticeships’, which excludes them from being counted as measures under active labour market policy.
3. For more information on the generation of the transition types, see Brzinsky-Fay (2007).
4. This was done using optimal matching (OM). Together with Ulrich Kohler and Magdalena Luniak, the author of this paper has created a bundle of commands for optimal matching analysis for the Stata software package. It is available from the SSC archive at <http://ideas.repec.org/s/boc/bocode.html>. An article on this tool is published in the Stata Journal (Brzinsky-Fay, Kohler and Luniak, 2006).

5. A number of coefficients can be applied in order to indicate the optimal cluster solution, but none of these test statistics can be used for sequence analysis because they do not take into account the sequential character of the data. After checking for all solutions from three to ten clusters, the decision was driven by the existence of analytically meaningful groups. Another argument for the eight-cluster solution is that it enables the research to obtain groups with a sufficient number of cases.
6. The quality of the migration variables in the ECHP is very heterogeneous across countries. Therefore, migration background is measured here using a dummy variable that indicates whether an individual was born within the country of residence (national) or not (non-national).

REFERENCES

- Blossfeld, H.-P. (1992), 'Is the German Dual System a Model for a Modern Vocational Training System?', *International Journal of Comparative Sociology*, **33** 3–4, 168–81.
- Brzinsky-Fay, C. (2007), 'Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe', *European Sociological Review*, **23** 4, 409–22.
- Brzinsky-Fay, C., Kohler, U. and Luniak, M. (2006), 'Sequence Analysis Using Stata', *Stata Journal*, **6** 4, 435–60.
- Franz, W., Inkmann, J., Pohlmeier, W. and Zimmermann, V. (2000), 'Young and Out in Germany: On the Youths' Chances of Labor Market Entrance in Germany', in Blanchflower, D.G. and Freeman, R.B. (eds), *Youth Employment and Joblessness in Advanced Countries*, Chicago: The University of Chicago Press, pp. 381–425.
- Gangl, M. (2003), 'The structure of labour market entry in Europe: a typological analysis', in Müller, W. and Gangl, M. (eds), *Transitions from education to work in Europe*, Oxford: Oxford University Press, pp. 95–116.
- Gangl, M., Müller, W. and Raffé, D. (2003), 'Conclusions: Explaining Cross-National Differences in School-to-Work Transitions', in Müller, W. and Gangl, M. (eds), *Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets*, Oxford: Oxford University Press, pp. 277–305.
- Halpin, B. (2003), *Tracks Through Time and Continuous Processes: Transitions, Sequences and Social Structure*. Paper presented at the Frontiers in Social and Economic Mobility, Cornell University, March 27–29.
- Hillmert, S. (2002), 'Labour market integration and institutions: an Anglo-German comparison', *Work, Employment and Society*, **16** 4, 675–701.
- Korpi, T., De Graaf, P., Hendrickx, J. and Layte, R. (2003), 'Vocational Training and Career Employment Precariousness in Great Britain, the Netherlands and Sweden', *Acta Sociologica*, **46** 1, 17–30.
- McVicar, D. and Anyadike-Danes, M. (2002), 'Predicting successful and unsuccessful transitions from school to work by using sequence methods', *Journal of the Royal Statistical Society*, **165** 2, 317–34.
- Müller, W. and Gangl, M. (2003), 'The Transition from School to Work: A European Perspective', in W. Müller and M. Gangl (eds), *Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets*, Oxford: Oxford University Press, pp. 1–19.
- O'Reilly, J., Cebrián, I. and Lallement, M. (eds) (2000), *Working-Time Changes. Social Integration Through Transitional Labour Markets*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar.
- OECD. (2005), *Education at a Glance. OECD Indicators 2005*. Paris: OECD.

- Peracchi, F. (2002), 'The European Community Household Panel: A Review', *Empirical Economics*, **27**, 63–90.
- Russell, H. and O'Connell, P. (2001), 'Getting a Job in Europe: The Transition from Unemployment to Work among Young People in Nine European Countries', *Work, Employment & Society*, **15** 1, 1–24.
- Sackmann, R. and Wogens, M. (2003), 'From Transitions to Trajectories. Sequence Types', in Heinz, W.R. (ed.), *Social Dynamics of the Life Course. Transitions, Institutions, and Interrelations*, New York: Aldine de Gruyter, pp. 93–115.
- Scherer, S. (2001), 'Early Career Patterns: A Comparison of Great Britain and West Germany', *European Sociological Review*, **17** 2, 119–44.
- Schmid, G. (1998), *Transitional Labour Markets: A New European Employment Strategy* (Vol. FS I 98–206), Berlin: Wissenschaftszentrum Berlin für Sozialforschung (WZB).
- Schmid, G. (2002), 'Towards a Theory of Transitional Labour Markets', in Schmid, G. and Gazier, B. (eds), *The Dynamics of Full Employment. Social Integration Through Transitional Labour Markets*, Cheltenham, UK and Northampton, MA, USA: Edward Elgar, pp. 151–95.
- Schmid, G. (2006), 'Social Risk Management Through Transitional Labour Markets', *Socio-Economic Review*, **4** 1, 1–33.
- Schmid, G. and Schömann, K. (2004), *Managing Social Risks Through Transitional Labour Markets. Towards A European Social Model* (Vol. 2004–01), Amsterdam: SISWO/Institute for the Social Sciences.
- Tremblay, D.-G. and Le Bot, I. (2003), *The German Dual Apprenticeship System. Analysis of its Evolution and Present Challenges* (Vol. 2003–4A), Québec: Université du Québec.
- Wagner, K. (1998), *The German Apprenticeship System after Unification* (Vol. FS I 98–301), Berlin: Wissenschaftszentrum Berlin (WZB).

Institutions and School-to-Work Transitions.

Conjunctural Effects on Labour Market Integration of School Leavers

Christian Brzinsky-Fay

Draft paper, please do not cite

Author Info:

Christian Brzinsky-Fay
Social Science Research Center
Research Unit "Skill Formation and Labour Markets"
Reichpietschufer 50
10785 Berlin
phone: ++49 (0) 30 25 49 15 94
email: brzinsky-fay@wzb.eu

Document Info:

filename: institutions_stwt_v81.docx
last saved: 10/10/2011
pages: 38
words: 11519
characters: 66495

Abstract:

The entry into the labour market is shaped by a couple of different factors, whose effects are difficult to disentangle. Successful school-to-work transitions depend on individual factors – such as education or migration background – as well as on general economic conditions and institutional factors – such as certain features of educational or employment systems.

Within the last two decades, a couple of comparative institutional classifications have emerged – first of all, Esping-Andersen's *Three Worlds of Welfare Capitalism* (1990) or Hall and Soskice's *Varieties of Capitalism* (2001b) –, which assume that institutions function as complements and, therefore, constitute regimes. At the same time, when analysing institutional effects most researchers maintain a purely variable-oriented approach and its additive logic of causality. But, the analysis of institutional regimes requires the application of a more case-oriented holistic approach that regards conjunctural effects, which is hardly done so far.

This paper aims at filling this gap by providing the examination of institutional configurations' effects on two indicators of school-to-work transitions, namely the relative youth unemployment and the NEET (not in employment, education or training) rate. The analysis comprises 30 OECD countries and their institutional factors that are composed of both, the educational system and the employment system. Applying the Qualitative Comparative Analysis (QCA) in an exploratory as well as analytical manner, some of the appearing methodological problems can be alleviated and insights into complex institutional causalities can be gained.

Content

1. INTRODUCTION	4
2. THEORETICAL BACKGROUND	6
3. METHODS & DATA	8
3.1. COMPARATIVE RESEARCH, REGRESSION & QCA	8
3.2. COUNTRY SELECTION & VARIABLES	10
3.3. CONDITIONS	12
4. CONJUNCTURAL INSTITUTIONAL EFFECTS ON LABOUR MARKET INTEGRATION OF SCHOOL LEAVERS ..	16
4.1. CONDITIONS FOR RELATIVE YOUTH UNEMPLOYMENT	16
4.2. CONDITIONS FOR NEET RATE	20
5. CONCLUSION & OUTLOOK.....	23
APPENDIX.....	25
A1. FUZZY VALUES AND CONFIGURATIONS	25
A2. DESCRIPTION OF DATASET	26
A3. COUNTRIES' CONFIGURATIONS (BASIC CONDITIONS)	27
A4. X-Y-PLOTS OF SOLUTION CONFIGURATIONS FOR HIGH RELATIVE YOUTH UNEMPLOYMENT	28
A5. X-Y-PLOTS OF SOLUTION CONFIGURATIONS FOR LOW RELATIVE YOUTH UNEMPLOYMENT	29
A6. X-Y-PLOTS OF SOLUTION CONFIGURATIONS FOR HIGH NEET RATE	31
A7. X-Y-PLOTS OF SOLUTION CONFIGURATIONS FOR LOW NEET RATE.....	33
REFERENCES	35

1. Introduction

The transition from the education system into the labour market remains a critical period within the life course. The main reasons are the lack of work experience and thus, less information for employers about school leaver's qualification and productivity. Labour market entrants always compete with older employees, which simply have the advantage of a previous work. Additionally, they benefit to a stronger extent from employment protection legislation, which favours established employees. These facts make school leavers in particular vulnerable for macro-economic cyclical depressions, which empirically results in higher youth unemployment and higher precariousness within school-to-work transitions. Many studies revealed that early employment conditions have remarkable influences on the later employment career (Ellwood 1982; Hammer 1997; Arulampalam 2001; Gregg 2001; Kletzer and Fairlie 2003; Müller and Gangl 2003; Nordström Skans 2004; Mroz and Savage 2006; Luijkx and Wolbers 2009).

In principle, this problem is positively perceived and active labour market policy programmes targeting at young people are created in every industrialised country. Throwing a glance at country differences regarding different levels of youth unemployment across the OECD, it becomes evident that these differences cannot be attributed solely to different economic conditions or social and educational heterogeneities of young people. Because national differences are to a certain extent systematic, the institutional arrangements are assumed to play an important role (Raffe 2008). In comparative research, a couple of functional equivalents were detected, that is when different institutional configurations lead to similar outcomes. These functional equivalents – or cases of 'equifinality' – are difficult to explore for theoretical as well as for methodological reasons.

From the theoretical perspective, many existing labour market theories can be used to derive hypotheses regarding labour market entrants, but only a few of them refer to institutional effects on school-to-work transitions. Additionally, there is no specific transition theory, neither for labour market transitions, in general, nor for transitions between education and employment system, in particular. Those theories involving institutions as conditions that shape transitions are only covering the effects of one single institution despite their claim for covering regime effects. Wide-range concepts that aim to explain the functioning of labour markets as a whole – such as the *Varieties of Capitalism* approach – are lacking methodological tools that allow their appropriate analysis.

From the methodological perspective, the analysis of regime or system effects is a challenging task, because regimes are composed of several institutional features that can reinforce as well as exacerbate each other. In the current literature, institutional effects basically are analysed using regression analysis and its various extensions, either by including dummy variables replacing a pre-defined regime types or by including variables for single institutions into the model. While in the first design institutional interactions are blurred to a large extent, the second design suffers from the concept of additive causality that underlies regression models and impedes the detection of complex causality (cf. King, Keohane et al. 1994).

The aim of this paper is to take on with these shortcomings and to identify combined effects of institutional configurations on school-to-work transitions. Which institutions are important for the transition from school to work and which configurations of them have what kind of effects? The basic assumption is that the same characteristic of one institution will have different outcomes when combined with another institution. This is a much broader scope than the usual common practice, only examining additional net effects of single institutions, which are assumed to be independent from each other. While using the method of *Qualitative Comparative Analysis* (Ragin 1987; Ragin 2000), the detection of institutional configurations that lead to more favourable transition processes of school leavers becomes possible. Institutions examined in this paper are part of the employment system, such as wage-bargaining structure, employment protection and net replacement rate, as well as of the education system, such as vocational specificity, stratification, and standardisation. The school-to-work transitions are captured by relative youth unemployment and the NEET rate.

The following paragraph examines the major institutional and labour market theories that have the potential to provide hypotheses concerning institutional effects on the transition between education and employment system (section 2). This includes a short research review that focusses on evidences of institutional effects. The illustration of the method of Qualitative Comparative Analysis (QCA), an explanation of the country selection and the data used is given in section 3, where also the outcomes (indicators that measure school-to-work transitions) and conditions (institutions of education system and labour market) are described. The results of the QCA analysis and the conclusions are presented in section 4 and 5.

2. Theoretical Background

Variations in empirical outcomes regarding school-to-work transitions “cannot all be attributed to differences in countries' economies or to compositional differences in young people's social or educational backgrounds” (Raffe 2008: 277). Hence, the examination of institutions has been an important issue in comparative research. Institutional theories provide explanations for how institutions affect individual outcomes, in general, while labour market theories are particularly concerned with the analysis of labour market mechanisms. Both streams provide a fundament for the examination of school-to-work transitions, but in the end – as Raffe (Raffe 2008) states “transition-system research often appears theoretically eclectic and fragmented”, indeed.

The major theory concerned with the socioeconomic relevance of institutions and institutional regimes for economic performance that also regards the employment and the education system is the *Varieties of Capitalism* (VoC) approach (Hall and Soskice 2001b). Capitalist economies are distinguished according to their mechanisms of economic coordination. Crucial institutions are seen as complementary and, therefore, are relatively stable across time. The VoC approach distinguishes between coordinated market economies (CME) and liberal market economies (LME), which provide different incentives to economic actors leading to different comparative advantages regarding the production of certain commodities and the provision of social benefits. Consequently, convergence of political and economic institutions that can be found in classical industrialisation and modernisation theory (Collier and Messick 1975; Eyestone 1977) is denied. The VoC approach emphasises the 'varieties' of capitalist economies.

Institutional regimes comprise the relevant spheres of industrial relations, the vocational education and training system, corporate governance, inter-firm relations and relations with own employees (Hall and Soskice 2001a). A school-to-work transition system can be defined as “relatively enduring features of a country's institutional and structural arrangements which shape transition processes and outcomes” Smyth et al. (2001). In order to examine the transition between school and employment, institutional arrangements of the labour market and the education system usually are examined. One would expect that a lot of possible combined effects are within the scope of this approach. But, an in-depth analysis can hardly be found, or, in other words, the regime analysis within institutional approach has stopped halfway. Within the VoC approach, for example, all the different possible combinations of institutional specificities are summarised in two types of political economies, namely CMEs and LMEs. And even the transition regime approach only analyses institutions as single characteristics, which do not show conjunctural effects.

There are a couple of theories in economics concerned with institutions and their effects. Economists are interested in institutions in so far as they affect the (labour) market mechanism. In short, the neoclassical market model assumes that a well-functioning wage mechanism avoids involuntary unemployment. Labour market theories aim at explaining persistent unemployment either by particular shortcomings of the neoclassical model or by institutional rigidities. In contrast to the

standard model which does not offer explanations for the disadvantaged position of young people, some labour market theories do so.

The *signalling theory* provides explanations for the matching between labour market supply and demand by emphasising the importance of certificates and credentials. This refers very much to the standardisation of education systems. The imperfect information of employers regarding qualifications and the expected productivity of employees constitutes a disadvantage for young people. Because labour market entrants have no work experience and no references from other employers, they face a higher risk of being misjudged by employers regarding their qualifications and future productivity, because employers tend to avoid high transaction costs that result from erroneous hiring decisions. Highly standardized education systems provide employers with comparable information on the employees' qualifications. Therefore, the relevant hypothesis (again regarding the effect of single institutional characteristics) derived from this theory is:

- H1: The higher the standardisation of the education system, the lower the relative youth unemployment (NEET rate).

The *human capital theory* provides explanations for educational effects on the labour market (Becker 1962; Bowman 1966; Mincer 1974; Becker 1975). Employees are not homogeneous but differ according to their human capital, meaning their investment in education and training and their work experience. While originally only focussed on wages, later extensions of the human capital theory also emphasised individual chances for favourable labour market entry, which increase with higher level of education (cf. Müller and Shavit 1998). Additionally, human capital theory distinguishes between specific and general human capital, of which the former is associated with better labour market entrance chances, because of clearer qualification signals. Regarding institutional characteristics the following hypotheses can be derived:

- H2: The higher the vocational specificity, the lower the relative youth unemployment (NEET rate).

The *insider-outsider theory* is concerned with these dimensions by stating that job holders as insiders have a more powerful position than outsiders – such as unemployed or labour market entrants (Lindbeck and Snower 1989). Therefore, insiders have more resources in order to negotiate their wages and working conditions. This theory provides explanations for effects of union density and employment protection leading to hypotheses:

- H3: The higher the employment protection (union density), the higher the relative youth unemployment (NEET rate).

All these hypotheses are well researched additively as net effects under control of other institutional and individual factors. However, the conjunctural effects between particular institutional characteristics constitute a fundamental research gap. This leads to limited explanatory power when it comes to countries which deviates from the rules. Even if it is recognised as a problem (Esping-Andersen 2000: 81) There is only very few research on these effects, which mostly is concentrated on the case of Denmark (Boeri, Conde-Ruiz et al. 2004; Breen 2005). One of the main reasons is the lack of an appropriate method, which is capable to analyse conjunctural effects.

3. Methods & Data

3.1. Comparative Research, Regression & QCA

The method of comparison constitutes one of the basic means of social science, in general. (Ragin, Berg-Schlosser et al. 1996). Putting social or political phenomena of a certain unit in contrast to those of another allows researchers to qualify these phenomena either as higher or lower or as better or worse. When comparing countries, one runs into the classical "many variables, few cases" dilemma (Lijphart 1971; Lijphart 1975), where many variables are needed to describe a countries' complexity while at the same time, the number of (comparable) countries remains small. Since statistical methods require at least 30 cases even for simple inferences, they are only rarely applicable. On the other side, a few countries can be analysed qualitatively in form of case studies. Here, in principle, the number of countries analysed is not limited by the methods but by practical problems, because comprehensive in-depth case studies require a lot of knowledge about the country, and even with large research groups, this remains a hard challenge. This results in a lack of studies with an intermediate number of countries (that is between 3 and 20) under investigation (Ragin, Berg-Schlosser et al. 1996).

The statistical method and case studies show some fundamental differences apart from the number of countries under investigation: statistical methods use a highly-formalised mathematical toolbox, while case studies require a rather subjective definition of measures and research strategies. Additionally, statistical methods have an inductive approach, which means testing hypotheses, whereas qualitative case studies have a deductive approach, which means that their objective is to develop hypotheses and theories. This implies a heuristic focus that aims at understanding objects and processes. The main objective is to investigate or detect causal relationships. In contrast, statistical methods have the objective of making inferences in order to establish generalisations that are ought to be valid beyond the cases under observation. Finally, case studies take over a holistic focus by regarding cases as a whole, whereas variable-oriented methods often only refer to single isolated characteristics.

Qualitative Comparative Analysis (QCA) was invented in the end of the 1980s by Charles Ragin (Ragin 1987; Ragin 2000), who originally claimed QCA is a method between qualitative and quantitative approaches. In fact, although the label of QCA is 'qualitative', it combines characteristics of both: Unlike most of qualitative methods, QCA is highly formalised, even when its mathematical basis is not probability theory and linear algebra, but Boolean algebra or logical set theory. Like case studies, QCA aims at developing theories and hypotheses, while simultaneously, it is used by some proponents for testing hypotheses. QCA can be used for deduction – i.e. theoretically informed choice of variables – as well as for induction – gaining insights from case-knowledge about key conditions (Rihoux and Ragin 2009: 6). QCA aims at understanding its cases well, but at the same time it states the detected causal relationships as being of general character. The difference to the statistical method is that QCA by purpose only make causal statements about the cases under observation, which constitutes a so-called 'modest generalisation' (Rihoux and Ragin 2009: 11). This makes QCA a deterministic approach rather than a

probabilistic one. In order to avoid the polarisation between qualitative and quantitative methods, Ragin (and others) use the terminology 'case-oriented' vs. 'variable-oriented' method. Here, QCA also takes some medium position, because it regards cases as entities – i.e. it has a holistic approach –, while on the other hand, variables are focussed and hence, need to be determined properly. One of the major critiques concerned the fact that only dichotomous variables can be used for QCA (Goldthorpe 2000), because this involves a substantial loss of information – i.e. the variation of variables is disregarded. This limitation has been overcome by the introduction of fuzzy sets – the so-called 'fuzzy-set QCA' or fsQCA (Ragin 2000; Rihoux and Ragin 2009). Now, also interval-scaled variables could be used by applying so-called fuzzy algebra. Interval-scaled variables must be transformed into fuzzy scales considering specific case knowledge.

The dilemma of "many variables, few cases" (Lijphart 1975) while using regression models lowers the degrees of freedom, models become over-determined and, as a result, obtained coefficients are not robust (Goldthorpe 2000: 49). Additionally, regression models are based on the conception of additive causation, where each additional independent variable increases the explained variation of the dependent variable. But, in complex societies, causation is assumed to be complex or multiple, and hence, while different combinations of different causal factors can have the same effect (King, Keohane et al. 1994), regression models are not able to capture these mechanisms. Combined effects of certain institutions do not appear in such models. Including all possible interaction effects in regression models means to increase the number of independent variables and, as a result, significances of the estimates becoming smaller. The application of QCA enables researchers to analyse relationships between an outcome and all possible combinations of multiple predictors.

Another advantage for the application of QCA is that it is able to differentiate the effects of conditions on the outcome in two ways: first, the effect of an independent variable (condition) might differ between high and low values. While the correlation logic assumes linearity – that is a positive (negative) value in the independent variable leads to a positive (negative) value in the dependent variable – QCA analyses positive and negative outcomes independent from each other. Second, while correlations (and regressions) only estimate causes, with QCA researchers are able to assess necessary and sufficient conditions for a certain outcome.

The literature offers a couple of studies that aim to estimate the controlled effects of institutions and policies on labour market outcomes (Russell and O'Connell 2001; Gangl 2002; van der Velden and Wolbers 2003) using well elaborated regression models. There are some studies that use only aggregate data – e.g. Horn (2009) –, which suffer mainly from the small-N problem that allows only for including one institutional variable in one model. Estimating many models means indeed neglecting controlled effects between institutional variables. Based on the analysis of individual data, they estimate effects of institutions and/or policies on an aggregate (national) level on individual labour market outcomes, which, from a methodological viewpoint, lead to multilevel problems and low significance values of the

independent variables. As a result, macro-level effects can only be explored insufficiently.¹

On the other hand, a couple of researchers – mostly exponents of the variable-oriented approach – doubt that QCA constitutes a solution for all the problems of regression analysis mentioned above. For example, Goldthorpe (2000: 52) argues that “its results are far more exposed to major distortion [...] than are results derived from statistical techniques”, because of QCA’s deterministic rather than probabilistic character and because of its sensitivity to the coding of variables. Additionally, he claims that the small-N problem by no means is overcome by using QCA, which is partly true, because there are limitations in the number of variables that can be employed for a QCA analysis: the number of variables k determines the number of all possible combinations by 2^k . Hence, if we have three condition variables, we should at least have $2^3 = 8$ cases in order to avoid limited diversity – that is when too many logically possible combinations of conditions are not represented by empirical cases.

However, QCA has some obvious advantages, namely the ability to detect complex causality or – as Rihoux and Ragin (2009: 8) entitle it – ‘multiple conjunctural causation’, which is also beyond interaction effects. Additionally, it provides a holistic approach to the countries observed, differentiates between necessary and sufficient conditions and, finally, it is able to deal with a limited number of cases. These are the reasons why QCA is applied here as an exploratory tool in order to detect institutional configurations that condition aggregate outcomes regarding school-to-work transitions. In this paper, QCA is not mainly seen and applied as a theory-confirming or hypothesis-testing method², unlike some of the proponents of QCA would do. It is aimed to be used in a way that enables a further application within a triangulation research design of qualitative and quantitative methods.

3.2. Country Selection & Variables

Selecting cases in cross-national comparison implies some serious problems compared to selecting a random sample of individual from a certain population (Anckar 2007), because unlike drawing a random sample, country selection is an intentional process that involves – even unintended – selection bias. Especially, when the ‘most similar system design’ (Przeworski and Teune 1970) is applied – i.e. searching for differences between similar units – this obstacle becomes prevalent (Ebbinghaus 2005). When selecting countries researchers approach the so-called ‘Galton’s problem’ concerning the autonomy of selected cases. This is based on the logic of the scientific method, namely the repeatability of enquiries, which ensures the validity of scientific results. Validity is diminished, when the cases under observation are not independent from each other. Hence, international integration and globalisation, that are assumed to create a similar framework for nation states that results in increasing convergence of countries, constitute a serious challenge for

¹ See e.g. the OECD study on wage-setting institutions (OECD 2004b: footnote 52), which mentions that the analysis has to dispense with the inclusion of relevant control variables.

² Even Rihoux and Ragin (2009) while assessing types of usage of QCA only refer to “checking hypotheses or existing theories” instead of ‘testing’ or ‘confirming/rejecting’.

international comparisons. However, policy diffusion between countries is much more often aspired than it in fact occurs and path dependencies are prevailing in most countries. Apart from that, the research design of this paper aims at compiling most similar cases. The 30 OECD countries differ clearly with respect to their education and employment systems while most of the other variables are supposed to be constant. This is according to the ‘most similar system design’, which Lijphart defined – in contrast to case studies and the statistical method – as being the ‘comparative method’, which is

“[...] the method of testing hypothesized empirical relationships among variables on the basis of the same logic that guides the statistical method, but in which the cases are selected in such a way as to maximize the variance of the independent variables and to minimize the variance of the control variables.”

(Lijphart 1975: 164)

In other words, the control variables the researcher is not interested in should be constant, while the independent variables of interest should vary among the countries under investigation. The dependent variable(s) also should have a relative variation, because otherwise, effects of the independent variables couldn’t be detected. An overview of the outcome variables and for the conditions is given in the fuzzy values table in Appendix A1.

Most of the data for the institutional variables under investigation – i.e. the conditions – are taken from the OECD, who follows the institutional development in its member countries (for an overview about the dataset and the variable descriptions see Appendix A2). This is valid for employment (OECD 2004b, 2007b, 2008) as well as education institutions (OECD 2004a, 2005, 2007a), whereas the former have a little longer tradition. Youth unemployment information, indicators on wage-setting institutions and employment protection are provided by the OECD employment database and so is the indicator for vocational specificity – i.e. share of pupils in vocational education. The stratification variables – explained variance of competencies by ESCS and interdecile range of competencies – are taken from the PISA 2000, 2003 and 2006 databases, while the variables of selection age and school tracks for 15-year-old are provided by Education at a Glance (OECD 2005). The variables for the standardisation concept were also found in this publication. Unfortunately, many of the institutional variables are not provided for each year, so that they have to be held constant for the missing years assuming that institutions possess a relatively high persistence.

There are a couple of aggregate-level or individual-level outcome measures aiming at describing characteristics of school-to-work transitions, all of them having certain shortcomings. The question of which dimensions of school-to-work transitions are meaningful and how they can be measured remains problematic in practice (OECD 2008). Aggregate measures based on cross-sectional data are static representing only an average stock of unemployed for example, while excluding the number of entrances and exits as well as rapid changes during the transition period (Raffe 2008: 282). Individual measures also have a limited perspective, because mostly they look only at a relatively short period, which by definition stops with the first transition

into employment (Raffe 2008: 283). Apart from that, only unemployment and underemployment are examined in these measures.

However, since there are serious data limitations, two common aggregate measures are used here in order to assess the situation of school leavers during their transition between school and work. The first measure is the relative youth unemployment rate, which is calculated by simply dividing the unemployment rate for young people under the age of 25 by the adult unemployment rate of those who are older than 25. This provides an unemployment measure corrected by general labour market conditions to a certain degree. Apart from that, it shows the ratio of the youth unemployment to that of adults. And finally, this measure has the advantage of being available for all of the countries under observation. The second measure is the NEET rate, which describes the proportion of youth, which is neither in employment nor in education or training. This measure also comprises young people who are inactive and therefore provides a slightly broader picture of school leavers' situation.

3.3. Conditions

In the comparative school-to-work transition literature there is no doubt that essentially institutional characteristics of the education system and the labour market influence individual transition processes (cf. Müller 2005).

In the social science literature, the determinants that are used in order to describe countries' institutional context relevant for school-to-work transitions mostly are based on the degree of their vocational specificity. The ideal types are designated either as organisational vs. occupational spaces (e.g. Maurice, Sellier et al. 1986; Müller and Shavit 1998) or as internal vs. occupational labour markets (Marsden 1990; Marsden 1999). This dichotomy has proven to provide some explanatory power regarding Northern European countries, but it failed to explain mobility, status attainment and unemployment of labour market entrants in Southern Europe (cf. Gangl 2001) as well as the structure of labour market entry sequences of school leavers, in general (cf. Brzinsky-Fay 2007). Hence, additional to vocational specificity, one needs to draw on other institutional variables, such as standardisation of certificates and stratification of an education system (cf. Allmendinger 1989; Kerckhoff 2004).

An institutional linkage between education and the labour market as provided by vocational schools or apprenticeships has proved to have a considerable effect on labour market outcomes of young labour market entrants (e.g. Allmendinger 1989; Kerckhoff 1995; Kerckhoff 2000; Gangl, Müller et al. 2003; Julkunen 2010). Therefore, the *vocational specificity* of an education system is an important institutional feature that refers to the degree in which a vocational specialisation already occurs within the education system. It can be measured by the share of young people who are enrolled in vocational programmes (OECD 2005). The existence of a dual system of apprenticeship strengthens the positive effect of vocational specificity on probability of smooth transitions between school and work (Russell and O'Connell 2001; van der Velden and Wolbers 2003), but in order to avoid too much correlation between the conditions the concrete form of vocational education is neglected here.

The *stratification* of an education system refers to its within-selection procedures (Allmendinger 1989; Müller and Shavit 1998). In some publications, this concept is labelled 'selectivity' (e.g. Isengard 2003), while it's supposed to describe the same concept. Additionally, the degree of the education system's differentiation should be taken into account. Highly stratified systems are characterised by separated tracks within a given educational level, in which pupils were sorted in their school career, most often at the secondary school level (Kerckhoff 2004). There is a group of indicators – mostly suggested and established by the OECD – which is used to measure stratification such as the age at which children are selected into separate tracks and the number of different school types available for 15-year-olds (OECD 2005). These are combined to the stratification indicator, which is used in this paper. The expected effect of stratification on the school-to-work transition is the following: educational levels in a clearly stratified system correspond to the occupational structure and, therefore, the frequency of job shifts might be reduced. At the same time, upward permeability is not granted and later occupational mobility is expected to be lower in highly stratified education systems. The effects on relative youth unemployment and the NEET rate are not straightforward to hypothesize. Conjunctural effects, to which stratification contributes in a different direction, can be expected here.

The concept of *standardisation* describes "the degree to which the quality of education meets the same standards nationwide" (Allmendinger 1989: 233). It is not very clear-cut, but widely used and includes common teacher's training, school budgets, curricula definition, and nationwide examination standards. The OECD provides several indicators that comprise several aspects of school governance and accountability (OECD 2004a).³ Using indicators of school governance – such as school autonomy, government influence, or level of decision-making – one assumes that a lower degree of government influence and/or a higher degree of school autonomy is associated with lower standardisation. The level of decision-making between central and school-level refers to decisions about school staff, budget as well as curriculum. Are these decisions made on a central level, standardisation is high. The indicators of accountability – such as existence of national exams, or national assessments and inspections (cf. OECD 2007a) – also aim at reflecting standardisation. The rationale behind these indicators is the assumption that nationwide assessments of schools' educational outputs and regular inspection provide common incentives for schools to behave in a similar manner. In this paper, a composed indicator of standardisation is used, that includes the existence of national examinations, the level of school autonomy and the accountability index. The relevance of standardisation for labour market outcomes in the first instance refers to the clear information of certificates that is available for employers. They do not need to screen or train job entrants, and the number of job changes is about to decrease – i.e. the school-to-work transition becomes smoother (Allmendinger 1989: 239).

³ Based on OECD and own surveys, Horn (2009) also distinguishes two dimensions of standardisation, namely *centralisation* – i.e. relation between central government and school – and *accountability* – i.e. curriculum and examination controlling.

Important labour market institutions in general – as far as they are discussed in the literature – are wage-setting institutions, employment protection, taxation, benefit generosity, and active labour market policies (Eichhorst, Feil et al. 2008). In this paper, employment protection, union density and the net replacement rate are being regarded as relevant for school-to-work transitions. They will be examined regarding their measurement and their presumed effects on youth labour markets.

Wage-setting institutions affect general economic performance and unemployment by directly influencing the price mechanism on the labour market. In the literature, the characteristics of union density, bargaining coverage and the centralisation/co-ordination of wage bargaining play the main role (OECD 2004b). Union density is defined as the ratio of (active) union members and employed workers and reflects the strength of union's influence in labour markets. A second measure for this is the collective bargaining coverage that gives the proportion of employees that are covered by negotiated collective labour agreements, even if they are not union-members. The corporatist structure is measured by the level of centralisation or coordination.

On the one hand, high union density and high bargaining coverage correlate with lower overall wage inequality, which also seem to apply to relative wages of youths. On the other hand, both is associated with a higher level of real wages, inflation and unemployment rates and lower employment (Aidt and Tzannatos 2002). Regarding the effects of centralisation of wage bargaining on labour market outcomes, the picture remains inconsistent. There is no decisive evidence, neither for the 'hump-shaped' relation between bargaining level and unemployment according to Calmfors and Driffill (1988), nor for the linear relation as proposed by (Soskice 1990), who emphasised co-ordination instead of centralisation as being the crucial characteristic (van der Velden and Wolbers 2003; OECD 2004b). However, the evidence for effects on employment chances and risks of school leavers appear lucid. According to the insider-outsider-theory (Lindbeck and Snower 1989), school leavers are outsiders by definition. Hence, high union density and high bargaining coverage represent insider power and can be expected to have negative effects on youth' labour market indicators. This is mediated by a higher general wage level, which is caused by high union power (cf. OECD 2004b: 138). The positive effects of union density and bargaining coverage on wage equality point in the same direction, because it seems that the higher the wage dispersion in a country is the higher the employment rate of young people is. Therefore, it can be expected that these variables have negative effects on integrative potential and volatility. From these indicators that are usually used in order to examine the effects of wage-setting institutions, only union density is used here. This is mainly, because using all four indicators would mean to measure one institution with similar indicators. For QCA, only a limited number of conditions can be included in the analysis.

One of the main influencing factors for the integration process of young people is the degree of *employment protection* (e.g. van der Velden and Wolbers 2003; Breen 2005; Julkunen 2010). It comprises regulations regarding hiring and dismissal of employees, ensuring job security on the one hand, while narrowing flexibility of employers on the other. Regarding the effects of employment protection on overall economic performance researchers have found contradictory results (OECD 2007b).

As suggested by the insider-outsider-theory (Lindbeck and Snower 1989), established employees have negotiated better employment conditions in collective labour agreements – such as seniority decreasing established workers' risk of being fired, while increasing new workers' probability of losing their job (or not even gaining one). This "last in, first out" principle remarks an extreme example and has a strong negative effect on school-to-work transitions (cf. van der Velden and Wolbers 2003). The indicator used here is the OECD indicator of strictness of employment protection (OECD 2004b), who is referred to as “the best indicator that is available at the moment for the purpose of making international comparisons” (Ochel 2005: 47). Nevertheless, there are some weaknesses, which are widely discussed (cf. Ochel 2005; Eichhorst, Feil et al. 2008), but for lack of alternative options this indicator is used here.

Apart from these generally accepted institutional factors, some other factors are incorporated to the QCA analysis. From the PISA database, two indicators are added: first the dependence of pupils' reading competencies on their parents' economic, social and cultural status (ESCS), and second, the interdecile range of reading competencies in the respective country (OECD 2001; OECD 2004c; OECD 2007c). Both of these indicators reflect the efficiency of the education system, based on the normative concept that education systems should countervail both intergenerational transmission of educational success and educational inequality. Because of the widespread persuasion that increasing international competition deteriorates the situation on youth labour markets, the KOF index of economic globalisation is added (Dreher 2006; Dreher, Gaston et al. 2008).

All the variables are calibrated by transforming the original variables into fuzzy scales by sorting them into ranks and standardising them. The missing values and values of 0.5 are determined by the author according to qualitative information about the respective labour markets or education systems.

4. Conjunctural Institutional Effects on Labour Market Integration of School Leavers

This analysis aims at examining the effects of an array of institutional conditions on two youth labour market outcomes for 30 OECD countries.⁴ The outcomes are the relative youth unemployment and the NEET rate, while the conditions are employment protection, vocational specificity, stratification, standardisation, net replacement rate, union density, the explained variation in reading competencies by ESCS, the interdecile range in reading competencies and the degree of economic globalisation. Because the number of conditions is far too high in relation to 30 cases, the number of conditions needs to be reduced. Therefore, from these nine conditions, four basic conditions were defined ex-ante, that is employment protection, vocational specificity, stratification and standardisation. The criterion for this pre-selection is the high relevance in the existing literature. The remaining five conditions were added alternating separately and pairwise, while conducting the fsQCA reduction applying the Quine-McCluskey algorithm. From the resulting 15 solutions⁵ the one is chosen, which meets the following criteria: 1) highest consistency & coverage and 2) appearance of the additional condition in the solution, and 3) high number of solutions who entered the minimisation algorithm as true. Following this explorative strategy, relevant conditions are identified while reducing the number of possible conditions at the same time.

This procedure is conducted separately for both outcomes leading to different condition sets that enter the algorithm. After some descriptive results, positive and negative outcomes are also analysed including the analysis of necessary and sufficient conditions. The problem of limited diversity is tackled by calculating the most parsimonious solution as well as the blanket assumption.

4.1. Conditions for Relative Youth Unemployment

The first QCA is conducted using high relative youth unemployment as outcome. Apart from the variables set by definition (employment protection, vocational specificity, stratification and standardisation), the explorative selection of the variables described above identified the interdecile range in reading competencies as relevant. The ideal types created according to the fuzzy values of the basic conditions can be found in appendix A3. This table indicates that limited diversity according to the basic conditions exist, but on a relatively low level. Only for three logical combinations there is no empirical equivalent. However, the effect of limited diversity has to be tested. The application of the Quine-McCluskey algorithm⁶ reveals the following solution, which is shown in Table 1. The solution consistency is at an acceptable level of 0.770, describing how good the empirical cases are described

⁴ For the calculations the statistical software package Stata is used, for which Longest and Vaisey (2008) have created the programme “fuzzy”.

⁵ One out of five conditions (=5) entered separately, and two out of five conditions (=10) add up to 15 models.

⁶ From the 30 cases, 25 solutions enter the reduction, the so-called *primitive expressions*. The significance level for the test of the configuration’s y-consistency against the 0.700 level is set to 0.1.

by all configurations of the solution, the so-called *prime implicants*. The total coverage is at 0.806, which means that more than 80% of the empirical cases are described by the whole solution. Looking at the prime implicants reveals that no single variable is necessary or sufficient, because they only affect the outcome in combination with another variable. The variable that – according to previous research – should have a strong effect on high relative youth unemployment is high employment protection (E). Applying QCA reveals that this effect is only valid if combined with low standardisation (s). The same is true for vocational specificity, which also enters the overall solution in combination with other variables. Additionally, vocational specificity unfolds its effects in different ways: a low vocational specificity (v) leads to high relative youth unemployment if it's combined a high differential in reading competencies (F). A high vocational specificity (V) also exhibits this effect, but only if it's combined with low differential in reading competencies (f) or if combined with low stratification (t).

Table 1: Reduced solution for high relative youth unemployment (Y)

Set	Raw Coverage	Unique Coverage	Solution Consistency
v*F	0.526	0.018	0.893
V*f	0.460	0.011	0.780
E*s	0.460	0.052	0.829
t*F	0.566	0.014	0.869
V*t	0.487	0.000	0.838

Total Coverage = 0.806

Solution Consistency = 0.770

Because there seems to be at least little limited diversity, it is necessary to analyse the influence of the logical remainders, which is done by calculating the most parsimonious solution. The logical remainders are entering the reduction with all possible outcomes and the algorithm takes the simplest solution. The result is shown in Table 2.

Table 2: Most parsimonious solution for high relative youth unemployment (Y)

Set	Raw Coverage	Unique Coverage	Solution Consistency
V*f	0.460	0.024	0.780
E*s	0.460	0.052	0.829
t*F	0.566	0.067	0.869
v*F	0.526	0.018	0.893

Total Coverage = 0.806

Solution Consistency = 0.777

The most parsimonious solution supports the fact that the influence of the logical remainders is not very strong, because four of the configurations enter the solution after their inclusion. Only the combination of high vocational specificity and low stratification (V*t) is no longer part of the solution.

After this reduction and the calculation of the most parsimonious solution, the degree of necessity and sufficiency is examined graphically by looking at the X-Y-

plots of the solution configurations and the outcomes. A condition is said to be sufficient if nearly all cases are located above the diagonal – that means that all fuzzy values of the outcome are greater than or equal to the fuzzy values of the respective condition set. Apart from the graphical examination, the consistency and raw coverage are taken to determine the sufficiency or necessity of a condition (or configuration). For example, the solution consistency of the configuration v^*F in the last column of Table 2 must be high in order to identify this condition as sufficient. As a rule, a value of 0.9 is interpreted as sufficient, while the raw coverage reflects how much of all the cases is explained by a sufficient condition. The information from the solution table and from the graphs reveal that the configuration v^*F and to a certain extent the configurations t^*F and E^*s can be accepted as sufficient conditions for a high relative youth unemployment. For all three acceptable solutions, the unique coverages are quite small, which indicates that the solutions are overlapping, which means that single solutions describe more but one single case.

A condition is considered as necessary, if the fuzzy values of the condition are greater than or equal to the fuzzy values of the outcome that means that all cases need to be located below the diagonal. For the calculation of the necessity of a configuration, also the consistency and coverage are used. Here, the value of the consistency for sufficient conditions is equal to the value of the coverage for necessary conditions. As a result, no condition can be regarded as necessary, because in the graphical display, most of the conditions lie above the diagonal and the raw coverage values (= consistency for necessary conditions) are clearly too small.

To summarise, high relative youth unemployment has no necessary institutional condition but sufficient institutional conditions. The first configuration is the combination of low vocational specificity and high differential in reading competencies (and high relative youth unemployment), for which Greece, Italy, New Zealand and the United States are good examples. In these countries, school leavers with heterogeneous reading competencies and no vocational qualifications enter the labour market and, therefore, face a couple of problems finding jobs. The second configuration is composed of a low stratification and a high interdecile range of reading competencies. For this configuration, no theoretical explanation is available⁷, so that only ex-post hypothesising is possible. High differences in competencies without any tracking could lead to risk aversion of employers being reluctant to employ school leavers, from which they not even recognise a certain school level. However, this configuration we find in Greece, New Zealand, Australia, the United Kingdom, Norway and Poland. The third sufficient condition is the combination of high employment protection and low standardisation, which can be found in Austria, Belgium, Italy, Korea and Spain. Thus, employment protection has only a negative effect, if it's combined with a low standardisation.

According to the “standards of good practice” regarding the application of QCA, the analysis on negative outcomes should be conducted separately (Schneider and Wagemann 2010: 408). This means to conduct the second QCA with the same

⁷ The analysis of conjunctural causation challenges existing classical theories, because nearly all of these are formulated according to the additive logic focusing only on isolated net effect of single institutions.

conditions for the non-occurrence of the outcome that is the occurrence of low relative youth unemployment. It is expected that the conditions, which are found by applying the Quine-McCluskey algorithm, differ from those that were found by analysing the positive outcome. Moreover, the conditional logic of QCA implies that the solutions for the negative outcome are not simply the negation of those from the positive outcome, as the correlational logic would assume. The result of the reduced solution for low relative youth unemployment is shown in Table 3.

Table 3: Reduced solution for low relative youth unemployment (y)

Set	Raw Coverage	Unique Coverage	Solution Consistency
V*T*S*f	0.295	0.083	0.836
e*s	0.591	0.055	0.826
e*T	0.499	0.013	0.923
e*V	0.515	0.026	0.821

Total Coverage = 0.758

Solution Consistency = 0.814

The consistency of the reduced solution for the negative outcome is satisfying, whereas the total coverage is a little lower than in the analysis of high relative youth unemployment. The first solution (V*T*S*f) describes a very special configuration composed from high vocational specificity, high stratification and standardisation and low differences in reading competencies. This can only be found in the Netherlands, and the low raw coverage and the – for a solution comprised of four prime implicants – high unique coverage support that only one country is covered by this solution. The consistencies and coverages of the other three prime implicants are quite high suggesting that these solutions are valid. However, in order to complete the picture, the logical remainders should be included into the analysis by calculating the most parsimonious solution (Table 4).

Table 4: Most parsimonious solution for low relative youth unemployment

Set	Raw Coverage	Unique Coverage	Solution Consistency
V*T*f	0.378	0.109	0.837
e*s	0.591	0.322	0.826

Total Coverage = 0.700

Solution Consistency = 0.813

The total coverage is clearly lower than in the reduced solution, and the solution is only composed of two prime implicants, one of which (V*T*f) is similar to the first term from the reduced solution, but even this simpler form has only a low raw coverage. The second prime implicant (e*s) describes at least three countries well that is Denmark, Ireland and Slovakia.⁸ The inspection of the X-Y-plots of the solution conditions (see Appendix A5) reveals that the solution e*T (low employment protection combined with high stratification) is the only configuration that could be

⁸ New Zealand and Iceland are also fitting into this category, but there we find a high relative youth unemployment (Appendix A2).

seen as sufficient condition, because apart from Italy and Korea, all the countries are located above the diagonal, and the high consistency value in the reduced solution also suggests this conclusion. But because it does not appear in the most parsimonious solution and because it mostly fits countries very well that have a medium instead of a low fuzzy value on relative youth unemployment (Hungary, Czech Republic, Slovakia; Switzerland), there are too many counter-arguments for interpreting the QCA solution that way. The X-Y-plots also reveal that there is no necessary condition among the institutional variables or its connections for low relative youth unemployment.

Summing up the results for relative youth unemployment, the main statements about the institutional effects are the following:

- There is no institutional variables that solely show effects on low or high relative youth unemployment. All effects involve at least the combination of two variables.
- The solutions for high relative youth unemployment are more clear-cut than those for low relative youth unemployment.
- For both outcomes (high and low relative youth unemployment) no necessary condition could be identified.
- For high relative youth unemployment, three sufficient conditions could have been identified: 1) low vocational specificity and high differences in reading competencies (v^*F), 2) low stratification and high differences in reading competencies (t^*F), and 3) high employment protection and low standardisation (E^*s).
- For low relative youth unemployment, only one configuration is weakly sufficient namely low employment protection combined with low standardisation. Regarding relative youth unemployment, standardisation can, therefore, be seen as a catalyst for employment protection, which amplifies its effects in both directions.

4.2. Conditions for NEET rate

The second outcome variable, for which institutional effects are identified, is the NEET rate, which serve as complement for unemployment rates. The NEET rate describes the proportion of youth, who are neither in employment nor in education or training (cf. Furlong 2009). Therefore, this indicator also comprises inactive youth that aims at more appropriately capturing the problematic situation of youth in the school-to-work transition. However, despite its broader focus and higher appropriateness, a theoretical embedding of this indicator is difficult.

The explorative pre-analysis reveals union density as being most relevant besides the basic conditions employment protection, vocational specificity, standardisation and stratification. The reduced form of the first QCA is shown in Table 5. The consistency is on a barely acceptable level, while the total coverage is relatively high. Four prime implicants are calculated by the Quine-McCluskey algorithm, from which three are composed of two conditions (t^*u , e^*T and v^*T) and one only consists of one condition (s). Conditions for high NEET rate are low stratification combined with low union

density, low employment protection combined with high stratification, low vocational specificity combined with high stratification or simply low standardisation. The first term describes Greece, Korea, New Zealand and the USA, whereas a theoretical explanation is hard to find. However, its consistency is the highest, and the raw coverage is also on a reasonable level. The countries that fit into the second solution – that is countries with a low employment protection in combination with a high stratification (together with a high fuzzy value in the outcome) – are Hungary and Slovakia. The consistency of this solution is a little smaller, but also acceptable. The same is true for the third configuration (low vocational specificity and high stratification), which reflects the countries Hungary, Italy, Mexico, Spain and Turkey. a highly stratified education system with only few vocational programmes seems to push many school leavers into inactivity or unemployment. So does a low standardisation of the education system, which comprises the countries Belgium, Hungary, Italy, Korea, Poland, Spain, the United Kingdom and the United States. Correspondingly, the raw coverage is quite high, whereas the consistency of this solution is on a rather low level.

Table 5: Reduced solution for high NEET rate (N)

Set	Raw Coverage	Unique Coverage	Solution Consistency
t*u	0.546	0.039	0.881
e*T	0.437	0.022	0.794
v*T	0.509	0.076	0.860
s	0.707	0.126	0.708

Total Coverage = 0.872

Solution Consistency = 0.710

The calculation of the most parsimonious solution in order to capture the role of logical remainders reveals the elimination of two solutions (e*T and v*T) and the emergence of one new solution (v*u), which nearly covers all the countries of the former two solutions. However, this combination of low vocational specificity and low union density also leads to theoretical problems, because the interpretation is problematic.

Table 6: Most parsimonious solution for high NEET rate (N)

Set	Raw Coverage	Unique Coverage	Solution Consistency
s	0.707	0.177	0.708
v*u	0.608	0.086	0.842
t*u	0.546	0.000	0.881

Total Coverage = 0.859

Solution Consistency = 0.713

The analysis of necessary and sufficient conditions reveals a clear picture (see Appendix A6): none of the conditions, single or combined, can be regarded as sufficient or necessary. That means that the solutions only describe different countries and their respective solution paths, but that there is no common rule for high NEET rate observable that is valid in every country.

Again, to present the full picture, the negation of the outcome ‘high NEET rate’ will be examined as well. Table 7 presents the results of the reduced solution of institutional conditions for low NEET rate. Here, we have six prime implicants, which indicate a possible high overlap between the solution paths. It can be shown that the third solution (e^*v^*t) covers all countries of the forth (e^*v^*U), the fifth (e^*t^*S) and the sixth solution (e^*S^*u). Consequently, in the most parsimonious solution (Table 8), these terms are not part of the result anymore. The second solution (E^*S^*U) covers nearly all cases of the first two terms of the reduced solution. However, the coverage of the most parsimonious solution is too small that it can be accepted as a reliable result.

Table 7: Reduced solution for low NEET rate (n)

Set	Raw Coverage	Unique Coverage	Solution Consistency
$e^*V^*T^*u$	0.308	0.038	0.853
$E^*V^*S^*U$	0.366	0.109	0.871
e^*v^*t	0.456	0.018	0.792
e^*v^*U	0.426	0.016	0.912
e^*t^*S	0.406	0.009	0.844
e^*S^*u	0.327	0.000	0.847

Total Coverage = 0.711

Solution Consistency = 0.805

Analysing sufficiency and necessity of the conditions reveals that there are no necessary conditions for a low NEET rate (see Appendix 7). The configuration e^*v^*U comes closest to what is defined as a sufficient condition.

Table 8: Most parsimonious solution for low NEET rate (n)

Set	Raw Coverage	Unique Coverage	Solution Consistency
e^*v^*t	0.456	0.260	0.792
E^*S^*U	0.393	0.196	0.849

Total Coverage = 0.653

Solution Consistency = 0.788

The analysis of institutional conditions on the NEET rate shows the following results:

- The overall picture of the analysis of institutional conditions on the NEET rate is much more incoherent than the analysis of conditions on the relative youth unemployment.
- The analysis of logical remainders change the solutions stronger.
- The analysis of sufficiency and necessity of conditions reveals only one sufficient condition (e^*v^*U) for low NEET rate.

5. Conclusion & Outlook

The analysis of complex causalities regarding institutional effects using QCA in an exploratory manner constitutes a remarkable value-added for a couple of reasons: fuzzy set QCA can deal to a large extent with the small-N problem, it overcomes the logic of additive causality by regarding conjunctural effects and it is able to differentiate between sufficient and necessary conditions. Using data from the OECD, the analysis of institutional effects on two school-to-work transition indicators revealed interesting results that provide a good exploratory basis for further analysis and further theoretical development.

From the QCA analysis in this paper the following conclusions can be drawn:

- The fuzzy set QCA for relative youth unemployment and the NEET rate has led to strongly diverging results. The institutional conditions are far from being similar for both outcome variables.
- The results for relative youth unemployment were more coherent and clear-cut than those for the NEET rate. This may lead to the conclusion that unemployment is more straightforward influenced by institutional factors, whereas the NEET rate represents a less clearer concept which reflects individual preferences more than institutional arrangements.
- There is no institutional variable that solely show effects on low or high relative youth unemployment. All effects involve at least the combination of two variables. A low standardisation of the education system is the only single condition, which shows an effect on high NEET rate, but its consistency is quite low. This challenges the formulation of hypotheses.
- Therefore, it is hardly possible to confirm or falsify the hypotheses mentioned at the beginning of this paper (see Section 2). Hypothesis 1, for example, assumes that a high standardisation leads to low youth unemployment. As a result we see that low standardisation leads in combination with another variable to higher relative youth unemployment (Table 1 and 2), but also in combination with another variable to lower relative youth unemployment (Table 4). The same is true for hypothesis 2 regarding vocational specificity, where a high value (combined with another variable) and a low value (combined again with another variable) leads to high relative youth unemployment (Table 2).
- Theoretical explanations are often difficult to find, in particular if more than two conditions are combined in one solution. This offers a wide field of theoretical reasoning.
- The analysis of conditions for relative youth unemployment have shown that the results are more clear-cut for high relative youth unemployment than those for low relative youth unemployment. For both outcomes (high and low relative youth unemployment) no necessary condition could be identified.
- For high relative youth unemployment, three sufficient conditions could have been identified: low vocational specificity combined with high differences in reading competencies, low stratification combined with high differences in reading competencies, and high employment protection and low standardisation.

- For low relative youth unemployment, only one configuration is weakly sufficient namely low employment protection combined with low standardisation. Regarding relative youth unemployment, standardisation can, therefore, be seen as a catalyst for employment protection, which amplifies its effects in both directions.
- The analysis of institutional conditions on the NEET rate and their sufficiency and necessity reveals only one sufficient condition for low NEET rate.

Apart from these conclusions regarding the content, a methodological outlook can be given: In the context of a research design that aims at triangulation of qualitative and quantitative methods, QCA would be combined best with regression models, which then takes the advantage of having certain presumptions of institutional combinations, whose effects can be tested as interaction effects. Apart from that, another promising possibility for future applications of QCA seems to be the analysis of changes in institutional effects over time. Recent institutional approaches aim at examining the change of institutions in the long run (e.g. Thelen 2004; Streeck 2009). Using QCA in order to compare not a small-N number of countries, but a small-N number of time points, could provide interesting insights into changes in effects of institutions.

Appendix

A1. Fuzzy Values and Configurations

country	outcomes		conditions					
	relative youth unemployment	NEET rate	employment protection legislation	union density	vocational specificity	interdecile range of reading competencies	standardisation	stratification
AUS	0.41	0.44	0.14	0.45	0.59	0.52	0.39	0.24
AUT	0.07	0.23	0.52	0.69	0.86	0.76	0.20	0.86
BEL	0.66	0.65	0.66	0.83	0.79	1.00	0.49	0.93
CAN	0.14	0.54	0.07	0.52	0.03	0.24	0.29	0.28
CZ	0.38	0.47	0.45	0.72	1.00	0.72	0.25	0.72
DK	0.03	0.05	0.41	0.90	0.48	0.17	0.75	0.10
FIN	0.55	0.33	0.48	0.93	0.62	0.03	0.20	0.03
FRA	0.52	0.37	0.79	0.00	0.52	0.55	0.80	0.83
GER	0.00	0.40	0.69	0.38	0.93	0.97	0.89	0.97
GRC	0.97	0.86	0.93	0.48	0.28	0.79	0.64	0.38
HUN	0.34	0.82	0.28	0.34	0.24	0.31	0.07	0.62
ISL	0.83	0.00	0.24	1.00	0.31	0.38	0.95	0.00
IRL	0.10	0.19	0.10	0.76	0.07	0.14	0.61	0.48
ITA	1.00	0.93	0.72	0.66	0.45	0.66	0.14	0.66
JAP	0.24	0.16	0.34	0.28	0.21	0.41	0.04	0.45
KOR	0.90	0.72	0.55	0.03	0.34	0.00	0.46	0.41
LUX	0.86	0.12	0.90	0.79	0.76	0.69	0.95	0.90
MEX	0.48	0.96	0.83	0.17	0.14	0.28	0.71	0.76
NL	0.21	0.00	0.59	0.31	0.83	0.10	0.79	1.00
NZ	0.76	0.61	0.21	0.41	0.10	0.93	1.00	0.21
NOR	0.93	0.09	0.76	0.86	0.66	0.86	0.86	0.07
POL	0.59	0.75	0.31	0.59	0.72	0.59	0.00	0.34
POR	0.45	0.51	0.97	0.24	0.17	0.47	0.82	0.69
SVK	0.31	0.89	0.38	0.62	0.97	0.62	0.54	0.59
ESP	0.28	0.79	0.86	0.14	0.38	0.07	0.32	0.52
SWE	0.79	0.30	0.62	0.97	0.55	0.34	0.57	0.14
SWI	0.17	0.26	0.17	0.21	0.90	0.47	0.11	0.55
TUR	0.72	1.00	1.00	0.10	0.41	0.21	0.68	0.79
UK	0.62	0.68	0.03	0.55	0.69	0.83	0.36	0.31
USA	0.69	0.58	0.00	0.07	0.00	0.90	0.43	0.17

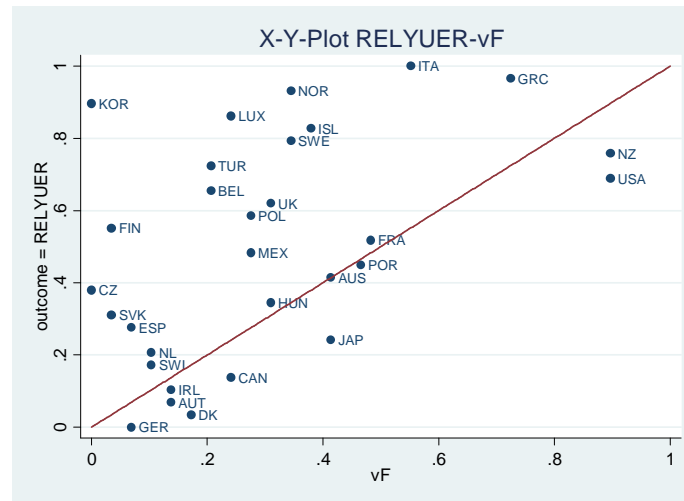
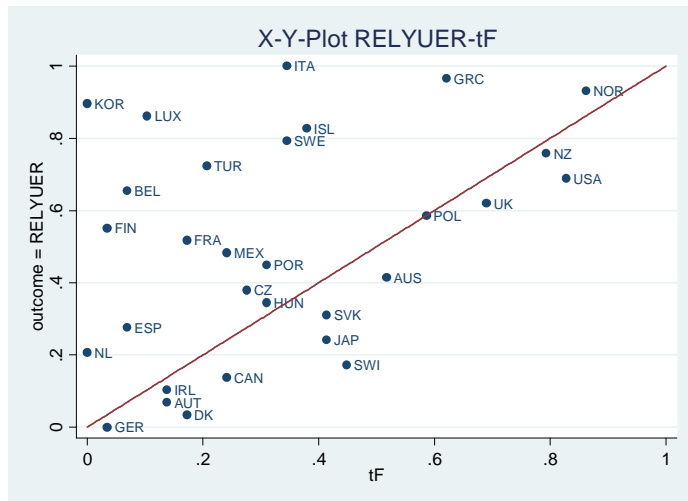
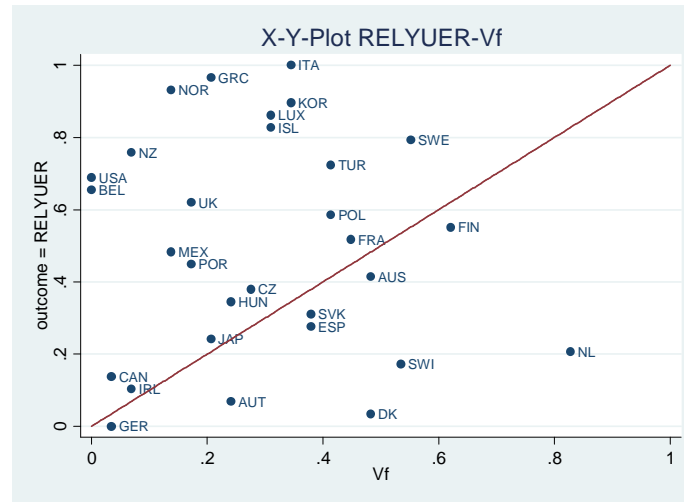
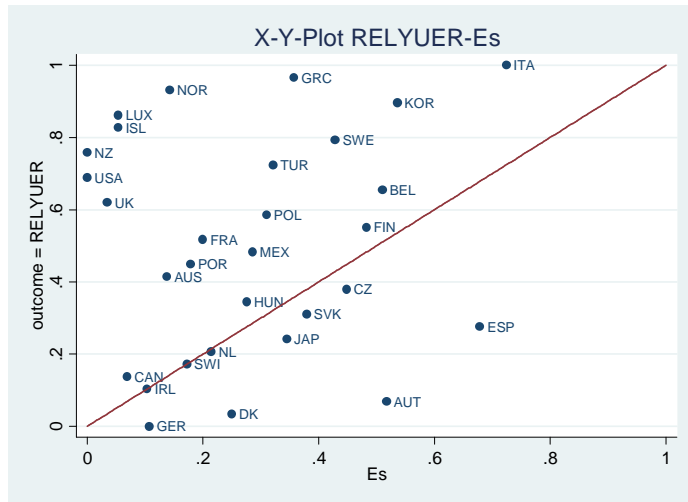
A2. Description of Dataset

Variable name		Description
country		Country
year		Year
relyue	Y/y	Relative youth unemployment (<25 years/25-64 years)
neet	N/n	NEET rate (<u>n</u> either in <u>e</u> mployment nor in <u>e</u> ducation or <u>t</u> raining) (<25 years)
epl	E/e	Index of employment protection (Version 1)
union	U/u	Trade union density
voced	V/v	Pupils in upper secondary education enrolled in vocational programme
diffcomp	F/f	Interdecile range in reading competencies
stand	S/s	Standardisation index
strat	T/t	Stratification index

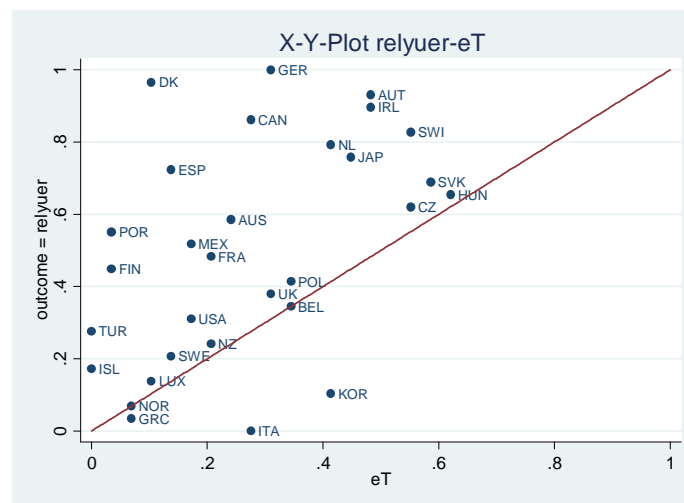
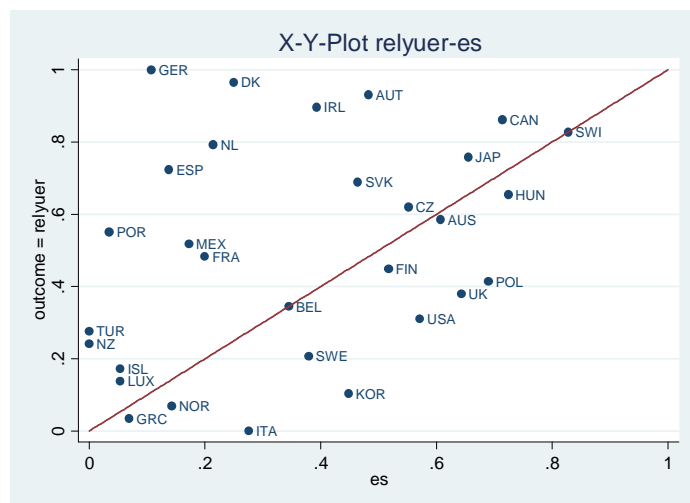
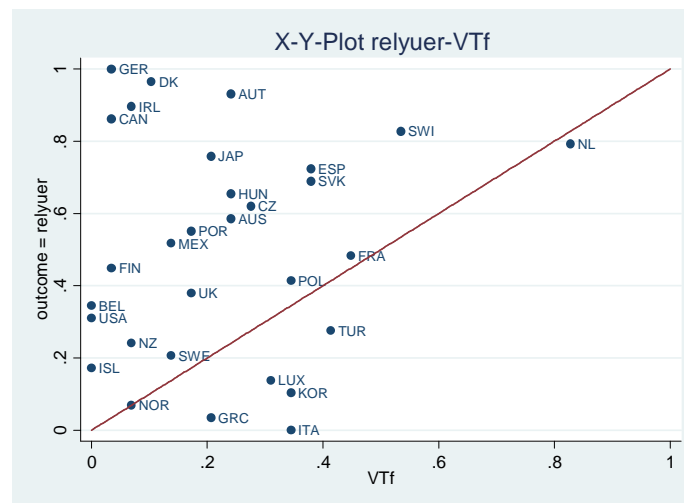
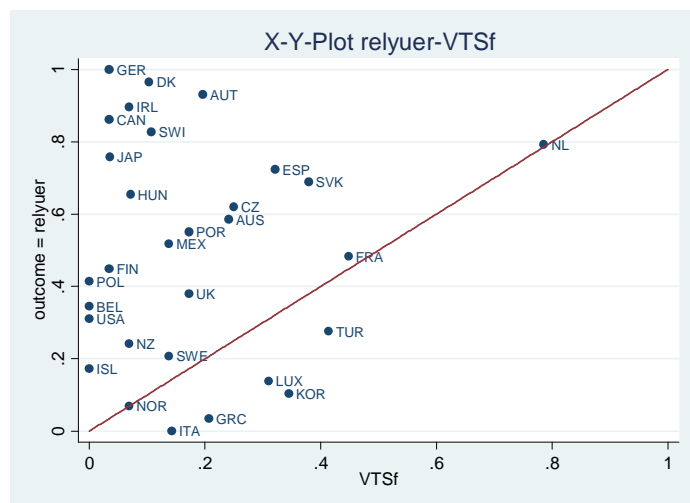
A3. Countries' configurations (basic conditions)

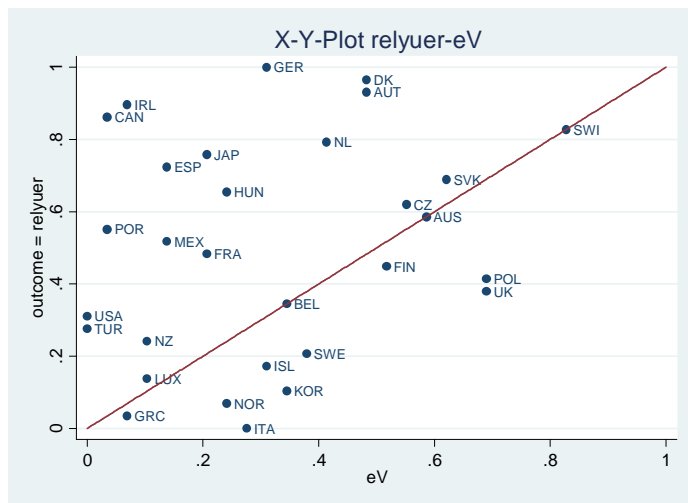
EPL * VOCED * STRAT * STAND	LUX NL FRA GER
EPL * VOCED * STRAT * stand	AUT BEL
EPL * VOCED * strat * STAND	NOR SWE
EPL * VOCED * strat * stand	
EPL * voced * STRAT * STAND	MEX POR TUR
EPL * voced * strat * STAND	GRC
EPL * voced * STRAT * stand	ESP ITA
EPL * voced * strat * stand	KOR
epl * VOCED * STRAT * STAND	SVK
epl * VOCED * STRAT * stand	CZ SWI
epl * VOCED * strat * stand	AUS FIN POL UK
epl * VOCED * strat * STAND	
epl * voced * STRAT * stand	HUN
epl * voced * STRAT * STAND	
epl * voced * strat * STAND	NZ DK ISL IRL
epl * voced * strat * stand	CAN JAP USA

A4. X-Y-plots of solution configurations for high relative youth unemployment

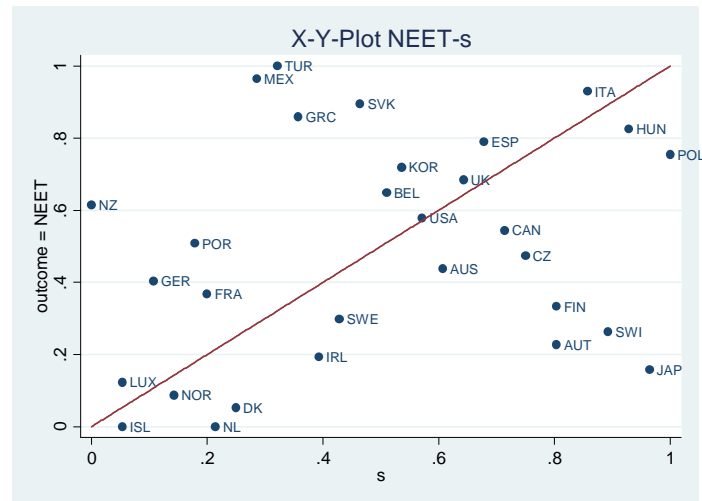
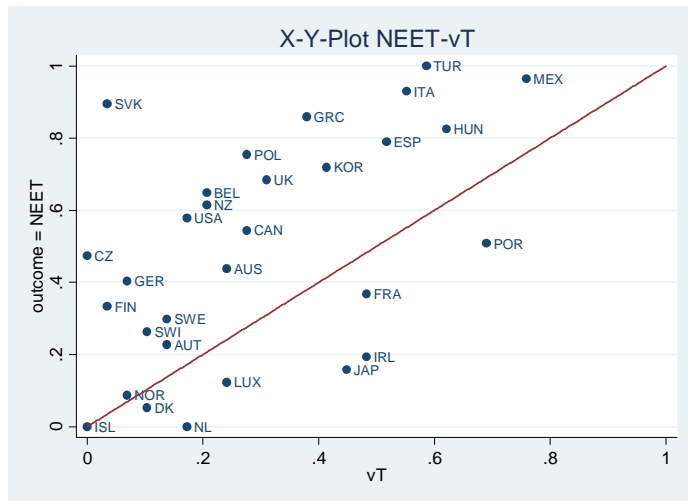
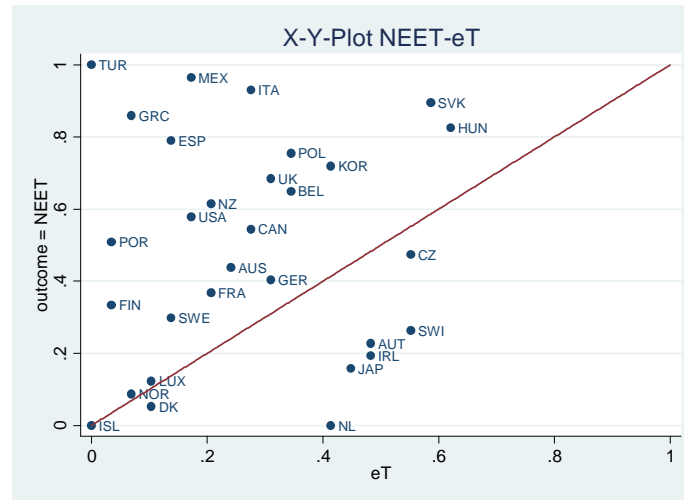
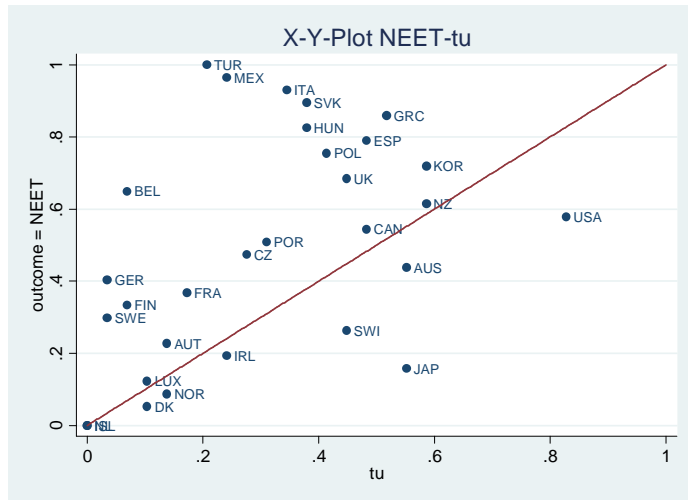


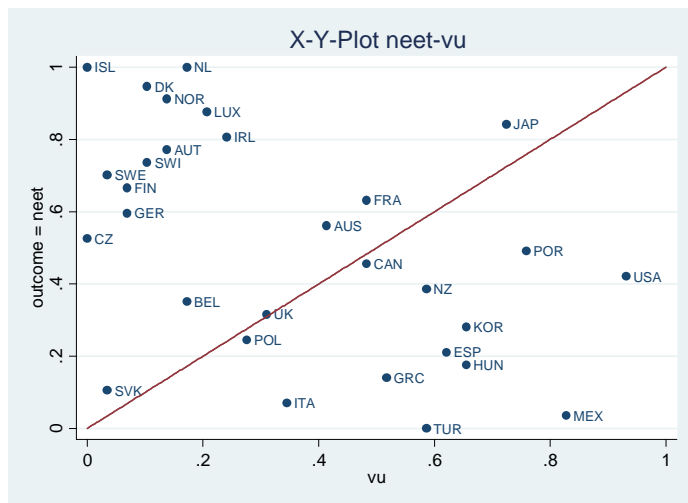
A5. X-Y-plots of solution configurations for low relative youth unemployment



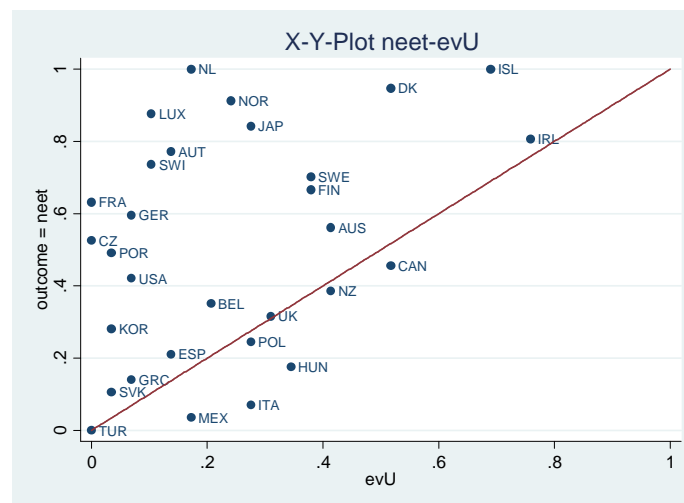
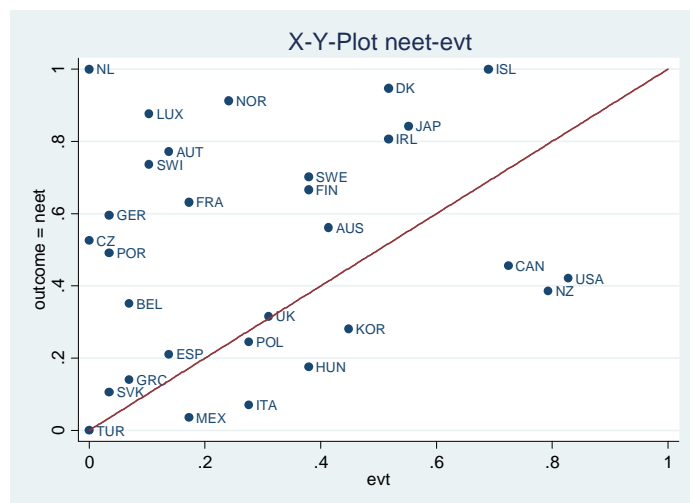
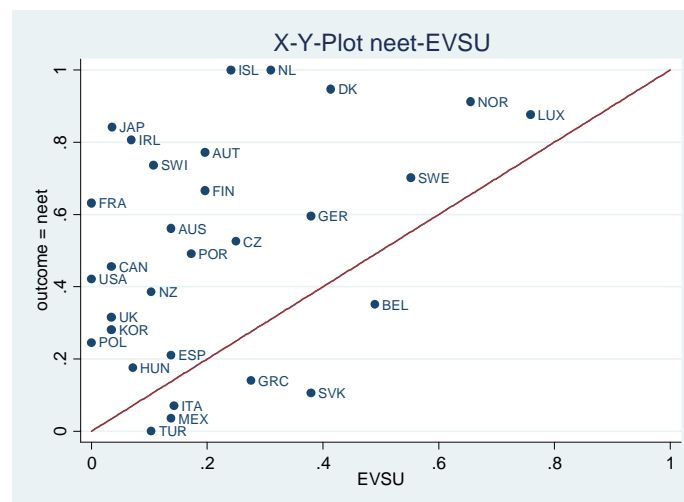
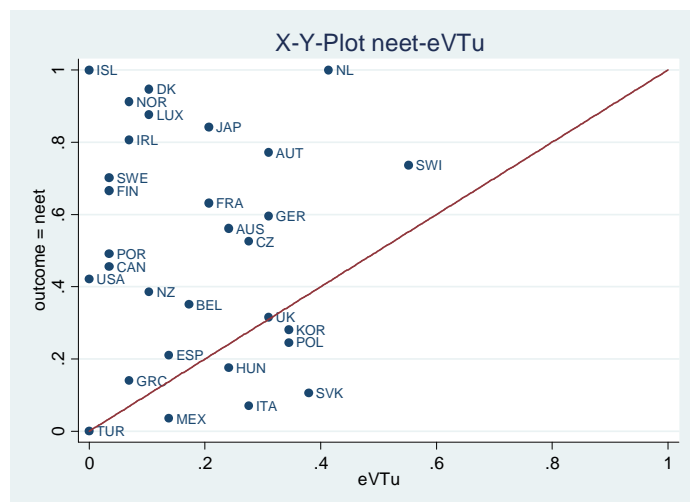


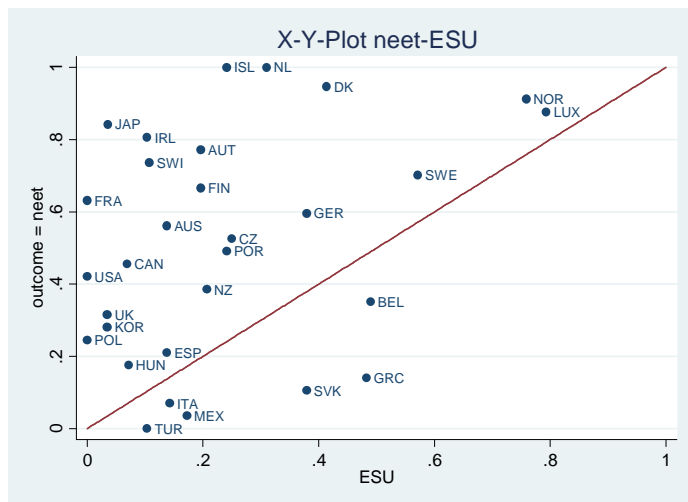
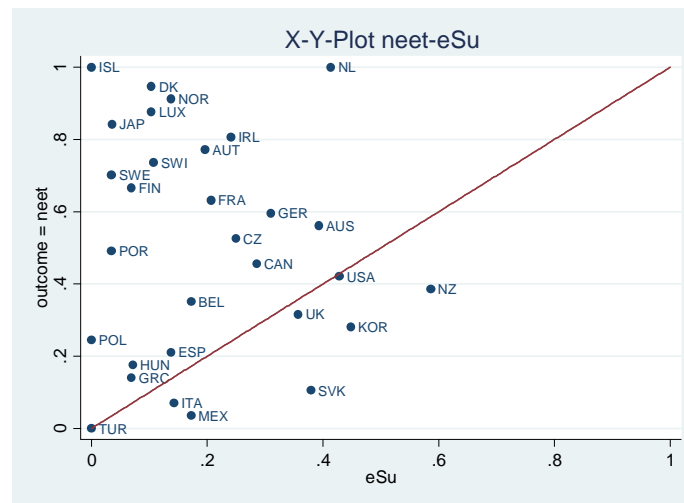
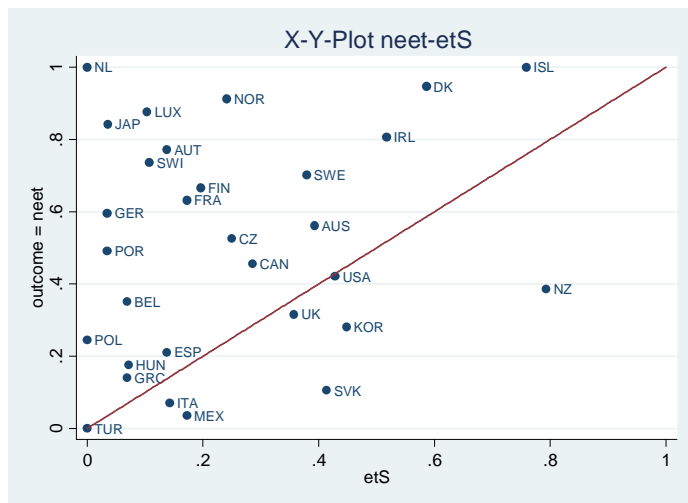
A6. X-Y-plots of solution configurations for high NEET rate





A7. X-Y-plots of solution configurations for low NEET rate





References

- Aidt, T. and Z. Tzannatos (2002). Unions and Collective Bargaining. Economic Effects in a Global Environment. Washington, D.C., World Bank.
- Allmendinger, J. (1989). "Educational Systems and Labor Market Outcomes." European Sociological Review 5(3): 231-250.
- Ankar, D. (2007). "Selecting Cases in Cross-National Political Research." International Journal of Social Research Methodology 10(1): 49-61.
- Arulampalam, W. (2001). "Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages." Economic Journal 111(475): 585-606.
- Becker, G. S. (1962). "Investment in Human Capital: A Theoretical Analysis." Journal of Political Economy 70(5, Part 2): 9-49.
- Becker, G. S. (1975). Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education. New York, Columbia University Press.
- Boeri, T., J. I. Conde-Ruiz, et al. (2004). Cross-Skill Redistribution and the Trade-Off between Unemployment Benefits and Employment Protection. Bonn, IZA.
- Bowman, M. J. (1966). "The Human Investment Revolution in Economic Thought." Sociology of Education 39(2): 111-137.
- Breen, R. (2005). "Explaining Cross-National Variation in Youth Unemployment. Market and Institutional Factors." European Sociological Review 21(2): 125-134.
- Brzinsky-Fay, C. (2007). "Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe." European Sociological Review 23(4): 409-422.
- Calmfors, L. and J. Driffill (1988). "Centralization of Wage Bargaining and Macroeconomic Performance." Economic Policy 6(1): 13-61.
- Collier, D. and R. Messick (1975). "Prerequisites Versus Diffusion: Testing Alternative Explanations of Social Security Adoption." American Political Science Review 69(4): 1299-1315.
- Dreher, A. (2006). "Does Globalization Affect Growth? Evidence from a new Index of Globalization." Applied Economics 38(10): 1091-1110.
- Dreher, A., N. Gaston, et al. (2008). Measuring Globalisation. Gauging its Consequences. New York, Springer.
- Ebbinghaus, B. (2005). "When Less is More. Selection Problems in Large-N and Small-N Cross-National Comparisons." International Sociology 20(2): 133-152.
- Eichhorst, W., M. Feil, et al. (2008). What Have We Learned? Assessing Labour Market Institutions and Indicators. Nürnberg, Institut für Arbeitsmarkt- und Berufsforschung.
- Ellwood, D. T. (1982). Teenage Unemployment: Permanent Scars or Temporary Blemishes? The Youth Labor Market Problem: Its Nature, Causes, and Consequences. R. B. Freeman and D. A. Wise. Chicago, University of Chicago Press: 349-390.
- Esping-Andersen, G. (1990). The Three Worlds of Welfare Capitalism. Cambridge, Polity Press.
- Esping-Andersen, G. (2000). Who is Harmed by Labour Market Regulations? Quantitative Evidence. Why Deregulate Labour Markets? G. Esping-Andersen and M. Regini. Oxford, Oxford University Press: 66-98.
- Eyestone, R. (1977). "Confusion, Diffusion, and Innovation." American Political Science Review 71(2): 441-447.
- Furlong, A., Ed. (2009). Handbook of Youth and Young Adulthood. New Perspectives and Agendas. London / New York, Routledge.

- Gangl, M. (2001). "European Patterns of Labour Market Entry." European Societies 3(4): 471-494.
- Gangl, M. (2002). "Changing Labour Markets and Early Career Outcomes: Labour Market Entry in Europe over the Past Decade." Work, Employment and Society 16(1): 67-90.
- Gangl, M., W. Müller, et al. (2003). Conclusions: Explaining Cross-National Differences in School-to-Work Transitions. Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets. W. Müller and M. Gangl. Oxford, Oxford University Press: 277-305.
- Goldthorpe, J. H. (2000). Current Issues in Comparative Macrosociology. On Sociology. Numbers, Narratives, and the Integration of Research and Theory. J. H. Goldthorpe. Oxford, Oxford University Press: 45-64.
- Gregg, P. (2001). "The Impact of Youth Unemployment on Adult Unemployment in the NCDS." Economic Journal 111(475): 626-653.
- Hall, P. A. and D. Soskice (2001a). An Introduction to Varieties of Capitalism. Varieties of Capitalism. The Institutional Foundations of Comparative Advantage. P. E. Hall and D. Soskice. Oxford, Oxford University Press.
- Hall, P. A. and D. Soskice, Eds. (2001b). Varieties of Capitalism. The Institutional Foundations of Comparative Advantage. Oxford, Oxford University Press.
- Hammer, T. (1997). "History Dependence in Youth Unemployment." European Sociological Review 13(1): 17-33.
- Horn, D. (2009). "Age of Selection Counts: a Cross-Country Comparison of Educational Institutions." Educational Research and Evaluation 15(4): 343-366.
- Isengard, B. (2003). "Youth Unemployment: Individual Risk Factors and Institutional Determinants. A Case Study of Germany and the United Kingdom." Journal of Youth Studies 6(4): 357-376.
- Julkunen, I. (2010). Youth Unemployment and Marginalization. Handbook of Youth and Young Adulthood. New Perspectives and Agendas. A. Furlong. London / New York, Routledge: 157-166.
- Kerckhoff, A. C. (1995). "Institutional Arrangements and Stratification Processes in Industrial Societies." Annual Review of Sociology 21: 323-347.
- Kerckhoff, A. C. (2000). Transition from School to Work in Comparative Perspective. Handbook of the Sociology of Education. M. T. Hallinan. New York, Kluwer Academic: 453-474.
- Kerckhoff, A. C. (2004). From Student to Worker. Handbook of the Life Course. J. T. Mortimer and M. J. Shanahan. New York, Springer: 251-267.
- King, G., R. O. Keohane, et al., Eds. (1994). Designing Social Inquiry. Scientific Inference in Qualitative Research. Princeton, Princeton University Press.
- Kletzer, L. G. and R. W. Fairlie (2003). "The Long-Term Costs of Job Displacement for Young Adult Workers." Industrial and Labor Relations Review 56(4): 682-698.
- Lijphart, A. (1971). "Comparative Politics and the Comparative Method." American Political Science Review 65(3): 682-693.
- Lijphart, A. (1975). "The Comparable Cases Strategy in Comparative Research." Comparative Political Studies 8(2): 157-175.
- Lindbeck, A. and D. J. Snower (1989). The Insider-Outsider Theory of Employment and Unemployment. Cambridge, MIT Press.
- Longest, K. C. and S. Vaisey (2008). "Fuzzy: A Programm for Performing Qualitative Comparative Analyses (QCA) in Stata." Stata Journal 8(1): 79-104.

- Luijkx, R. and M. H. J. Wolbers (2009). "The Effects of Non-Employment in Early Work-Life on Subsequent Employment Chances of Individuals in The Netherlands." European Sociological Review **25**(6): 647-660.
- Marsden, D. (1990). Institutions and Labour Mobility: Occupational and Internal Labour Markets in Britain, France, Italy and West Germany. Labour Relations and Economic Performance. R. Brunetta and C. Dell'aringa. Basingstoke, MacMillan: 414-438.
- Marsden, D. (1999). A Theory of Employment Systems. Micro-Foundations of Societal Diversity. Oxford, Oxford University Press.
- Maurice, M., F. Sellier, et al. (1986). The Social Foundations of Industrial Power. A Comparison of France and Germany. Cambridge / London, MIT Press.
- Mincer, J. (1974). Schooling, Experience, and Earnings. New York, National Bureau of Economic Research.
- Mroz, T. A. and T. H. Savage (2006). "The Long-Term Effects of Youth Unemployment." Journal of Human Resources **41**(2): 259-293.
- Müller, W. (2005). "Education and Youth Integration into European Labour Markets." International Journal of Comparative Sociology **46**(5-6): 461-485.
- Müller, W. and M. Gangl (2003). The Transition from School to Work: A European Perspective. Transitions from Education to Work in Europe. The Integration of Youth into EU Labour Markets. W. Müller and M. Gangl. Oxford, Oxford University Press: 1-19.
- Müller, W. and Y. Shavit (1998). The Institutional Embeddedness of the Stratification Process. From School to Work. A Comparative Study of Educational Qualifications and Occupational Destinations. Y. Shavit and W. Müller. Oxford, Oxford University Press: 1-48.
- Nordström Skans, O. (2004). Scarring effects of the first labour market experience: A sibling based analysis. Uppsala, IFAU Working Paper.
- Ochel, W. (2005). "Concepts and Measurements of Labour Market Institutions." CESifo DICE Report **4**: 40-55.
- OECD (2001). Knowledge and Skills for Life. First Results from the OECD Programme for International Student Assessment (PISA) 2000. Paris, OECD.
- OECD (2004a). Education at a Glance 2004. OECD Indicators. Paris, OECD.
- OECD (2004b). Employment Outlook. Paris, OECD.
- OECD (2004c). Learning for Tomorrow's World. First Results from PISA 2003. Paris, OECD.
- OECD (2005). Education at a Glance 2005. OECD Indicators. Paris, OECD.
- OECD (2007a). Education at a Glance 2007. OECD Indicators. Paris.
- OECD (2007b). Employment Outlook. Paris, OECD.
- OECD (2007c). PISA 2006. Science Competencies for Tomorrow's World. Volume 1 - Analysis. Paris, OECD.
- OECD (2008). Employment Outlook. Paris, OECD.
- Przeworski, A. and H. Teune (1970). The Logic of Comparative Social Inquiry. New York, Wiley Interscience.
- Raffe, D. (2008). "The Concept of Transition System." Journal of Education and Work **21**(4): 277-296.
- Ragin, C. C. (1987). The Comparative Method. Moving Beyond Qualitative and Quantitative Strategies. Berkeley / Los Angeles / London, California University Press.

- Ragin, C. C. (2000). Fuzzy-Set Social Science. Chicago, University of Chicago Press.
- Ragin, C. C., D. Berg-Schlosser, et al. (1996). Political Methodology: Qualitative Methods. The New Handbook of Political Science. R. E. Goodin and H.-D. Klingemann. Oxford, Oxford University Press: 749-768.
- Rihoux, B. and C. C. Ragin, Eds. (2009). Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques. Applied Social Research Methods Series. Los Angeles / London / New Dehli / Singapore, Sage.
- Russell, H. and P. O'Connell (2001). "Getting a Job in Europe: The Transition from Unemployment to Work among Young People in Nine European Countries." Work, Employment & Society **15**(1): 1-24.
- Schneider, C. Q. and C. Wagemann (2010). "Standards of Good Practice in Qualitative Comparative Analysis (QCA) and Fuzzy-Sets." Comparative Sociology **9**(3): 397-418.
- Smyth, E., M. Gangl, et al. (2001). A Comparative Analysis of Transitions from Education to Work in Europe (CATEWE). Final Report. Dublin, ESRI.
- Soskice, D. (1990). "Wage Determination: the Changing Role of Institutions in Advanced Industrialised Countries." Oxford Review of Economic Policy **6**(4): 36-61.
- Streeck, W. (2009). Re-Forming Capitalism. Institutional Change in the German Political Economy. Oxford, Oxford University Press.
- Thelen, K. (2004). How Institutions Evolve. The Political Economy of Skills in Germany, Britain, the United States and Japan. Cambridge, Cambridge University Press.
- van der Velden, R. and M. H. J. Wolbers (2003). The Integration of Young People into the Labour Market: the Role of Training Systems and Labour Market Regulation. Transitions from Education to Work in Europe: the Integration of Youth into EU Labour Markets. W. Müller and M. Gangl. Oxford/New York, Oxford University Press: 174-199.

Christian Brzinsky-Fay

The Concept of Transitional Labour Markets A Theoretical and Methodological Inventory

Discussion Paper SP I 2010-507

December 2010

Social Science Research Center Berlin (WZB)

Research Area:
Education, Work, and Life Chances

Research Unit:
Skill Formation and Labor Markets
<http://www.wzb.eu/bal/aam>

Project Group:
National Educational Panel Study: Vocational Training
and Lifelong Learning
<http://www.wzb.eu/bal/neps>

E-mail: brzinsky-fay@wzb.eu

Wissenschaftszentrum Berlin für Sozialforschung (WZB) •
Reichpietschufer 50 • D-10785 Berlin • www.wzb.eu

discussion paper

Social Science Research Center Berlin (WZB)

Wissenschaftszentrum Berlin für Sozialforschung
gGmbH (WZB)

Research Area:
Education, Work, and Life Chances

Forschungsschwerpunkt:
Bildung, Arbeit und Lebenschancen

Research Unit:
Skill Formation and Labor Markets

Abteilung:
Ausbildung und Arbeitsmarkt

Project Group:
National Educational Panel Study: Vocational Training and Lifelong Learning

Projektgruppe:
Nationales Bildungspanel: Berufsbildung und lebenslanges Lernen

Reichpietschufer 50, D-10785 Berlin
Phone: +49 30 25491-0, Fax: +49 30 25491-684
<http://www.wzb.eu>

Abstract

The aim of this article is to critically assess the concept of transitional labour markets (TLM) and its scientific importance. It seeks to provide a stock-taking of the methodological tools and discuss future theoretical and methodological perspectives. Since the TLM concept is by definition interdisciplinary and multi-methodological in nature, we need to ask about the extent to which this kind of openness is appropriate. The methodological review will go beyond the traditional schism of qualitative vs. quantitative research by including additional dimensions such as exploration, causal modelling, and questions regarding research design and data quality. The sources supporting this 'TLM inventory' are the essential publications (books, working papers, and journal articles) of the two major research projects explicitly based on the TLM approach: TRANSLAM and TLM.NET. The paper concludes with a number of suggestions how to enhance the TLM concept in theoretical and methodological terms.

Zusammenfassung

Das Ziel dieses Aufsatzes ist eine kritische Würdigung des Konzeptes der Übergangsarbeitsmärkte und seiner wissenschaftlichen Bedeutung. Er bietet eine Bestandsaufnahme der angewandten Forschungsmethoden und diskutiert zukünftige theoretische und methodologische Perspektiven. Das Konzept der Übergangsarbeitsmärkte hat per Definition einen interdisziplinären und multi-methodischen Charakter, so dass sich die Frage nach dem optimalen Maß dieser Offenheit stellt. Die methodische Bestandsaufnahme geht dabei über das klassische Schisma von qualitativer vs. quantitativer Forschung hinaus und berücksichtigt auch Dimensionen wie z.B. Exploration und Kausalmodelle sowie Fragen des Forschungsdesigns und der Dateneigenschaften. Die Quellen, auf die sich diese „TLM-Bestandsaufnahme“ stützt, sind die wichtigsten Publikationen (Monographien, Arbeitspapiere und wissenschaftliche Artikel) der beiden Hauptforschungsprojekte – TRANSLAM und TLM.NET – die explizit auf dem TLM-Konzept beruhen. Das Papier schließt mit einer Reihe von Anregungen, wie dieses Konzept in theoretischer wie auch methodischer Hinsicht weiterentwickelt werden sollte.

Contents

1.	Introduction	1
2.	The Concept of Transitional Labour Markets	3
3.	Analysing Transitions	7
4.	Analysing Policies and Institutions	10
5.	TLM and the Life-Course Perspective	12
6.	New Methodological Tools	15
7.	Summary	17
	References	18

1. Introduction

The concept of transitional labour markets (TLMs) serves as the theoretical background for taking a policy-oriented view on labour markets (cf. Schmid 1998; Schmid 2002; Schmid and Schömann 2004; Schmid 2006; Schmid 2008). Given an increasing demand for flexibility and the need to preserve social security in times when traditional full-employment is no longer feasible, this concept encourages policy-makers to address labour market transitions through institutional regulations and policies that safeguard and motivate both employers and employees. Such institutions are called ‘transitional labour markets’ and are located at critical stages of the life course such as the transition from education to employment, from homemaking to employment, or from part-time to full-time employment. To ascertain how TLMs need to be configured, it is essential to know the empirical shape of these transitions and the effects of institutional frameworks on individual transitions. In modern societies, the variety of possible employment pathways is increasing along with the possibility of making “wrong” decisions that lead into dead-end streets. At the same time, the whole process of labour market transitions is becoming more complex, and often more than one single choice may account for failure.

In order to achieve these goals, the TLM concept takes a holistic perspective, i.e. it does not only use a target-oriented instead of a programme-oriented approach (cf. Schmid et al. 1996), but also focuses on both the individual and the institutional level. Using this concept, researchers can

- analyse individual labour market transitions empirically,
- investigate their institutional determinants, and
- develop policies in order to enhance transitions.

This paper aims at summarising the studies that emerged from two large-scale research projects, namely TRANSLAM and TLM.NET, both of which were inspired by the TLM approach. It will not present an overview of the content or research field of these papers¹, however, but rather discuss shortcomings and promising perspectives in order to identify research gaps and future research potential. This review is based on the book series that emerged from the TRANSLAM project and consists of 66 articles (chapters)², and on the working paper series from the TLM.NET project, which includes 32 papers.³

The inventory of the TLM approach shall be made in terms of theories and methods. The theoretical inventory distinguishes between external and internal

1 This has already been done by Recio and de Bruijn (2006).

2 Cf. O'Reilly et al. (2000); de Koning and Mosley (2001); Schmid and Gazier (2002); Schömann and O'Connell (2002); Neugart and Schömann (2002); O'Reilly (2003).

3 The TLM.NET working papers can be downloaded from <http://www.siswo.uva.nl/tlm/>. A couple of them have been published in edited volumes, see e.g., Anxo et al. (2007), Lassinigg et al. (2007), Muffels (2008).

theoretical developments, while the methodological part is structured by levels of analysis, i.e. the individual, policy programme, and institutions. An overview of policy recommendations is not included here.⁴

The paper starts with a brief overview of the TLM concept itself and its evolution, illustrated by comparing the two large-scale projects mentioned above (section 2). The achievements and shortcomings of the analysis of individual transitions will be assessed in section 3, whereas the analysis of institutional and policy effects is the subject of section 4. With its longitudinal perspective and its focus on the institutional effects on individual transitions, the TLM approach bears some resemblances with life-course analysis, which marks a relatively new development. Section 5 provides a discussion of why this trend should be strengthened in the future. Finally, the tools necessary for further developing the TLM approach are mentioned in section 6.

4 An extensive overview of policy recommendations can be found in de Gier and van den Berg (2005) as well as in Schmid (2008: 281ff.).

2. The Concept of Transitional Labour Markets

The concept of transitional labour markets has mainly been developed since the early 1990s by G. Schmid at the Social Science Research Center Berlin (WZB). The objective was to create a comprehensive framework for labour market analysis based on normative foundations and empirical findings in order to promote coordinated efforts of labour market reform. Most of the research was conducted within two large-scale European research projects, namely "Social Integration by Transitional Labour Markets (TRANSLAM)" – from 1996 to 1998 – and "Managing Social Risks through Transitional Labour Markets (TLM.NET)" – from 2003 to 2007. Their main publications provide a useful and comprehensive outline of the main research findings within the TLM concept. Hence, they are reviewed here in terms of their content in order to identify trends of TLM's scientific development. The characteristics under consideration are theoretical (or conceptual) developments, methodological developments, empirical analyses, comparative designs, qualitative methods, quantitative methods, descriptive methods, explorative methods, and hypothesis-testing models.

Table 1: Characteristics of TLM studies

<i>Characteristics</i>	<i>TRANSLAM</i>	<i>TLM.NET</i>	<i>Total</i>
Theoretical/conceptual development	19,7%	34,4%	24,5%
Methodological development	6,1%	0,0%	4,1%
Empirical analysis	72,7%	68,8%	71,4%
Comparative design	30,3%	28,1%	29,6%
Qualitative study	34,8%	34,4%	34,7%
Quantitative study	59,1%	34,4%	51,0%
Exploration	4,5%	12,5%	7,1%
Description	36,4%	31,3%	34,7%
Hypothesis-testing	39,4%	21,9%	33,7%
No. of articles/papers	66	32	98

Source: author's compilation

As we can see in Table 1, there are some remarkable differences between the two projects regarding the content of their respective publications. In TLM.NET, theoretical reflection and development was clearly more strongly represented than in TRANSLAM, whereas methodological concerns were less pronounced. Given the increasing speed of methodological development, this indicates some small disparity between the theoretical and methodological development of the TLM concept.⁵ Em-

5 The last significant discussion of methodology for analysing transitions was published in the *Handbook of Labour Market Policy and Evaluation* (Schmid et al. 1996) and was more or less limited to evaluation methodology. On the one hand, this is a result of the methodological openness of the TLM concept. On the other hand, however, to the concept

pirical designs remain a shared feature of both projects and, therefore, can be seen as a characteristic feature of the TLM concept. The proportion of comparative analyses does not change very much either, but we might ask whether their share is appropriate since the TLM concept aims at providing a framework for comparative research, after all. In the TRANSLAM project, there were more quantitative than qualitative studies, whereas in the main publications of the TLM.NET project, this relation was even, which is probably related to the increasing share of explorative studies. Studies that were purely descriptive (without hypothesis-testing parts) play an important role, even if their proportion decreased in the TLM.NET project. Surprisingly, the number of hypothesis-testing research papers decreased significantly in the TLM.NET project. This is difficult to interpret, given the overall trend towards applying quantitative, hypothesis-testing research methods.

At this point, we may only speculate about the reasons for this development – or the drift towards theoretical issues – over time. The reasons are to be found more in the nature of the projects themselves than in external factors. Although both research projects were as interdisciplinary as the TLM approach itself, there were certain differences regarding the academic disciplines involved (see Figure 1).⁶ Whereas the TRANSLAM project was mainly conceived by economic and sociological research institutions, the TLM.NET project involved more political scientists, who rarely employ hypothesis-testing methods and tend to prefer theoretical approaches. Additionally, the different disposition of the two projects possibly plays a role: TRANSLAM was intended as a pure research project, whereas TLM.NET was funded as a ‘thematic network’ featuring a strong emphasis on policy development and dissemination. The two projects’ diverging intentions or objectives seem to have impacted the development of the TLM approach.

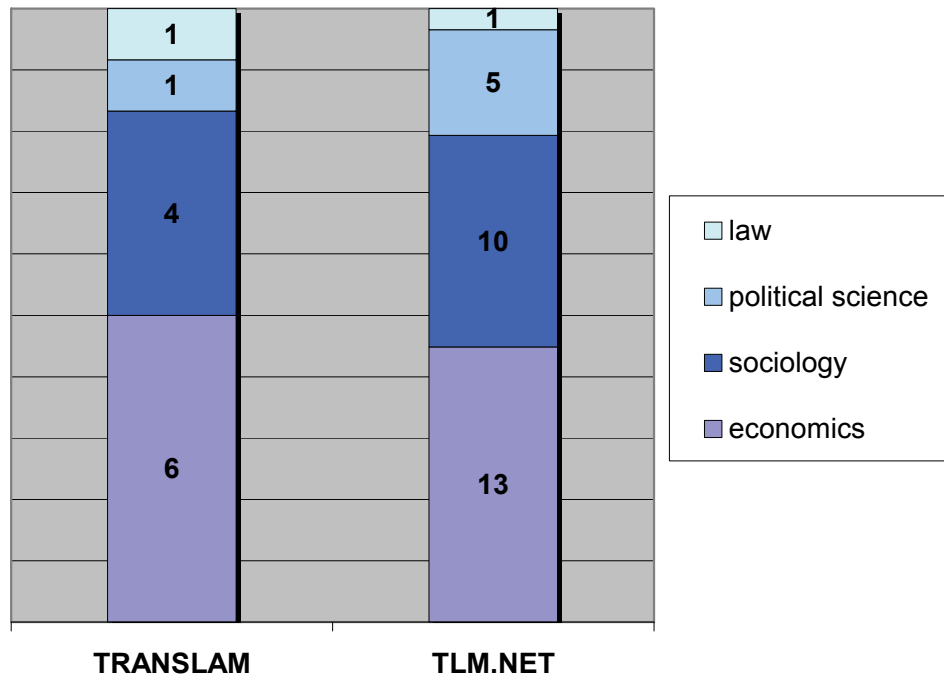
The TLM approach has a strong emphasis on international comparisons. It is interesting, therefore, to also look at the countries examined in the two projects. Table 2 shows how often specific countries were examined in the publications considered. The first important observation is that the TLM concept essentially concentrates on Western Europe, or in other words, on the European Union. The United States, Japan, or Canada – the only non-European countries under observation – only play a marginal role in both projects. The same is true for Eastern European countries, of which only Hungary was considered in a single paper.⁷ Despite the limited availability of data in Eastern European countries, this offers a lot of potential

might benefit from developing a kind of common set of methods in order to support further development of transition research.

6 It is hard to determine the professions of all researchers engaged within both projects. Therefore, the academic disciplines of the participating departments and their responsible researchers were counted.

7 In both projects, East Germany is rarely addressed as a separate entity. Depending on the availability of data, Germany was either analysed as a whole (e.g. Detzel and Rubery 2002; Kruppe 2002; Muffels 2005) or only West Germany was considered (e.g. Bothfeld and O’Reilly 2000). A distinct analysis of West and East Germany remained the exception (e.g. Schömann and Becker 2002).

Figure 1: Academic disciplines of participating researchers



Source: author's compilation

for future TLM research. Since Eastern European countries have a short (labour) market tradition compared to Western European countries, they are characterised by different labour market institutions and different individual transition histories. Additionally, each Eastern European country followed its own strategy when adopting a capitalist market economy. As a result, typologies and theories developed on the basis of Western European countries are challenged fundamentally.

The second observation is that the number of countries examined in a single publication increased from 2.27 to 3.76 on average. Given the stable share of comparative studies (see Table 1), this means that these comparative studies increased the number of countries studied, which is certainly a desirable development. The third observation is that the degree of concentration regarding the countries is decreasing. In the TRANSLAM project, research was concentrated on four countries (Germany, the Netherlands, France, and the United Kingdom), whereas in TLM.NET, the circle of frequently observed countries was expanded by including additional countries such as Denmark and Belgium.⁸ A possible interpretation and summary of these findings is that the focus has been expanded in the second project, but still remains within the Western European sphere.

⁸ The cumulative percentages are not shown here because the order of countries differs between the two projects.

Table 2: Countries considered in TLM projects (number of times mentioned)

<i>Country</i>	<i>TRANSLAM</i>	<i>TLM.NET</i>	<i>Total</i>
Netherlands	14	9	23
Germany	16	6	22
France	15	7	22
UK	14	5	19
Ireland	12	4	16
Spain	10	6	16
Denmark	4	8	12
Sweden	9	2	11
Belgium	1	7	8
Austria	4	4	8
Italy	2	5	7
Portugal	2	4	6
Finland	1	4	5
Greece	1	4	5
USA	2	1	3
Luxembourg	1	2	3
Japan	2	0	2
Hungary	0	1	1
Canada	1	0	1
Σ	111	79	

Source: author's compilation

3. Analysing Transitions

For every concept that aims to give policy recommendations, identifying the as-is state of the units of analysis is essential. The TLM concept is focused not only on the investigation of institutions or policies, but also on the empirical examination of individual transitions. The term ‘transition’ implies the use of longitudinal data: We need at least two statuses within an individual labour market career to define the transition, i.e. the status change. Furthermore, the increasing complexity of life courses also makes transitions more complex and interconnected in themselves.

The majority of quantitative studies within the TLM approach that address transitions at the micro-level use labour market statuses as their essential characteristic. The central shortcoming of most of these studies is that they only consider one single transition between labour market statuses (or on two time points, one initial and one destination point), while neglecting the long-term character of the basic concept of ‘transition’.

In his important contribution to the analysis of individual transitions, Kruppe (2002) argues that transitions are more than just one initial and one final status. Unfolding comprehensive transition matrices, he extends the analysis of transitions by pointing out the importance not only of transitions between employment and unemployment, but also between other labour market statuses such as inactivity, education, and retirement. Using data from the European Community Household Panel (ECHP), he finds that only 29 per cent of all transitions are moves between employment and unemployment. Kruppe’s work constitutes an important step towards a comprehensive empirical analysis of complex transition processes. However, his definition of transition remains limited to the two different statuses at $t-1$ and t , i.e. limited to a single change in labour market status. Another important contribution to the empirical analysis of transitions came from Muffels and Wilthagen (2002). They also used data from the European Community Household Panel (ECHP) and examined transitions between different statuses within different employment regimes and, therefore, related macro-level (institutional) conditions to micro-level (individual) outcomes, i.e. transitions on the labour market. Both Kruppe and Muffels/Wilthagen, however, define transitions simply as a change in status.

This limited operationalisation of transitions has certain effects on the theoretical dimension of transitions. The question “What is the difference between a transition process and a status change (event)?” remains unanswered and undiscussed. The same is true for the “upper boundary” of transitions: What is captured by the definition of “transition”, and when does a transition become a “life-course”?

The explorative dimension of transition analysis remains somewhat underdeveloped, because most studies are limited to descriptive, bivariate cross-tabulation of individual transition – i.e. status change – frequencies. Studies using exploratory methods for constructing transition types remain the exception, despite the fact that further developments of sequence analysis methods, multidimensional scaling, and cluster analysis have enhanced our ability to include more than one status

change (e.g. Brzinsky-Fay 2007). In order to facilitate mutual learning effects between method development, empirical analysis, and theoretical discussion, it seems helpful to refer to life-course research, where the concepts of 'trajectory', 'transition', and 'sequence' are theoretically distinguished in a plausible manner (cf. Sackmann and Wogens 2003). Operationalisations of empirical transition analyses should be based on an appropriate, theoretically derived definition of the transition concept: transitions need to be distinguished explicitly from the narrower 'status change' concept and from the broader 'life-course' concept.

Another shortcoming is that empirical transition studies lack a common normative dimension. In their analysis of transitions between different working time arrangements, O'Reilly et al. (2000) distinguished between these three key types of (working time) transitions. While concentrating on part-time employment and subsequent labour market prospects, it becomes obvious that the effects of the same transition differ considerably between different groups. For example, part-time employment has an integrating character for those who start from inactivity because their income and work experience increase, along with their likelihood of gaining stable employment. Adult employees who face the danger of unemployment, in contrast, tend to see part-time work as a step backwards in terms of career development and earnings compared to their previous position. If accompanied by professional training, however, the transition from full-time employment to part-time employment becomes maintaining, since reasonable training tends to increase employment chances. For young labour market entrants, part-time employment can only have an integrating quality if it's combined with education, e.g. in the form of an apprenticeship. If not combined with training, part-time employment also becomes a maintenance transition because labour market entrants start from a lower income level. Exclusionary transitions, the third (working time) transition type defined by O'Reilly, describes the most risky transitions that come along with a loss of income and career prospects. This kind of transition is likely to be experienced not only by people with low levels of education and skills, but also by individuals who interrupt their employment because of childcare responsibilities, for example. As a result, O'Reilly has shown that any taxonomy of transitions has to take into account not only the various kinds of labour market statuses, but also the characteristics of the individuals who undertake these transitions.

Although O'Reilly's typology is derived empirically with a focus on working time, it may be applied to other labour market transitions.⁹ For example, transitions into and out of temporary employment gain increasing attention in labour market research in general, and should be investigated more from a TLM perspective. Only a few publications are mainly concerned with the question of whether temporary employment serves as a 'bridge' or 'trap', and if so, for which groups (e.g. Cebrián et al. 2003; Hernanz et al. 2005). Conceptually, the normative definition of transitions should be generalised by, for instance, including important dimensions be-

9 For an application to school-to-work transitions, see Brzinsky-Fay (2008).

sides labour market status, e.g. income changes, sustainability of qualifications, and characteristics of the individuals taking these transitions.

Apart from conceptualising the transitions themselves, a number of studies also made an effort to conceptualise transition risks (Schmid and Schömann 2004). Distinguishing between 'risk' and 'opportunity' – with the former carrying a negative connotation and the latter a positive one, while both may be described more objectively by the term 'probability' – is only possible if transitions can be classified into 'favourable' and 'unfavourable', which implies a normative dimension.¹⁰ However, emphasising both the risk dimension and a normative definition of what constitutes 'good' or 'bad' transitions calls for the consideration of different levels that influence the transition probabilities, i.e. the individual and institutional level as described by Muffels (2005) in the agenda for a work package of the TLM.NET project. According to Gazier (2002), labour market efficiency can be improved by adjusting one or more of the following three parameters: prices (wages), quantities (persons employed and/or hours worked), and quality (skill matching, job characteristics). These parameters are seen as interrelated or complementary. At the same time, labour market segmentation processes should be avoided in order to reduce inequality. At the policy level, Gazier defines 'good' TLMs as those policy measures that enhance both labour market efficiency and equity among the labour force.

Summarising the research efforts with respect to the empirical analysis of transitions and transition risks, it is fair to state that there has been remarkable progress from the first TLM project (TRANSLAM) to the second (TLM.NET). There still is a lot of promising potential for the future, however. At this point, limitations in empirical and conceptual analyses of transitions may certainly be explained by data limitations. Additionally, it is hard to compare the empirical approach, i.e. exploring and classifying individual transitions, and the normative approach, i.e. qualifying transitions and TLMs as 'good' or 'bad'. One could compare the policy recommendations of the respective approaches, but practically, these approaches are not sufficiently integrated. Upcoming research activities in this field have to combine normative and empirical approaches in order to improve the consistency of the TLM concept.

10 Because the TLM approach features a strong emphasis on policy development, this normative dimension is justified. The objective is to establish policies that are able to manage the risks of transitions and that are negotiated by the persons or bodies involved (mostly social partners).

4. Analysing Policies and Institutions

Based on the analysis of individual transitions, their risk dimension, their normative features, and the recommendation of TLM policies, the TLM approach also seeks to evaluate these policies. A comparatively early conceptual development concerns the structured procedure for performing a scientific evaluation of active labour market policy (ALMP). The foundations for this policy orientation were created in the *Handbook of Labour Market Policy and Evaluation* (Schmid et al. 1996). An analytical evaluation framework that takes into account the basic implications of the TLM approach (e.g. aggregate focus, comparative approach) was developed by Schmid, Schömann et al. (1997). Systematically, it comprises all of the important dimensions that have to be considered with ALMP evaluation: context analysis, problem analysis, monitoring, and impact analysis. This effort, a very important one in my opinion, has received too little attention within the international academic community, however.¹¹

The consideration of complex policy processes has found its methodological equivalent in aggregate impact analysis and process evaluation (de Koning and Mosley 2001). Micro-level evaluations – the conventional method of active labour market programme evaluations – usually investigate programme effects on participating individuals, but rarely consider the aggregate impact, i.e. effects on the general economy or on the policy implementation process. Because individual and aggregate effects can be different, aggregate impact analysis aims at avoiding these shortcomings. Furthermore, given that the effects of active labour market policies depend on their implementation, the analysis must focus on the whole policy process. Both strategies involve qualitative and quantitative methodologies. One major shortcoming of all the applications of aggregated impact analysis and process evaluations is the fact that countries are always analysed separately. In other words, both tools lack a real comparative approach, which significantly limits their explanatory power. This is mainly caused by the complexity of national institutions and regulations, but reliable comparative analysis nonetheless needs an appropriate comparative toolbox to start with.

In contrast to the neglected exploratory analysis of transitions mentioned above, a number of studies develop typologies of active labour market policies (O'Connell and McGinnity 2002; Larsen 2005) in order to assess their combined effectiveness or to classify countries according to particular policy mixes. However, even these studies fail to examine TLM stability by distinguishing between long-term institutions and short-term policy programmes. Additionally, the increasing quantity of micro-evaluations of active labour market policies creates a need for meta-analyses that comprehensively review and summarise their results. The TLM

11 The main reason might be that it was only published as a discussion paper in German. Additionally, the evaluation of labour market policy programmes has become dominated by economists, who tend to ignore political science studies.

approach requires a comparative examination that takes into account institutional differences. Recently, there have been a few attempts towards this direction (de Koning and Peers 2007; Card et al. 2009). One major difficulty here is the high degree of specificity of ALMP programmes, which constrains their comparability. De Koning (de Koning 2007: 24) distinguishes six types of ALMP instruments: information instruments/mediation, job counselling, sanctions/bonuses, training, placement/wage subsidies, and job creation schemes. In order to assess the effects of employment regime features on ALMP programmes and their effects, more efforts in this respect are necessary.

5. TLM and the Life-Course Perspective

The broad range and conceptual openness of the TLM concept allows for linking it to a couple of theoretical approaches from many disciplines, mainly economics, sociology, and political science. This is why it may be characterized as a meta-theory, even if it is mostly referred to as a 'concept' rather than a 'theory'. The characterisation of the TLM approach as both an analytical and a normative concept made these dynamic influences possible and fruitful for further development of the TLM concept itself. However, it also runs the risk of being only an eclectic accumulation of different studies. Hence, it seems appropriate to explore the theoretical core of the TLM concept.

The TLM concept's basic idea relies very much on 'situational analysis' (Popper 1972; Popper 1994 [1963]). Based on critical rationalism and its falsification principle, situational analysis means the description and explanation of events in consideration of their historical and institutional context using inter alia rational principles.¹² Within this epistemological basis, one of the central theories that play an important role across most of the studies using a TLM approach is human capital theory (Becker 1962; Becker 1975). Since continuing education and life-long learning gain in importance in industrialised economies, transitions between the education system and the labour market obviously constitute a main focus of the TLM concept.¹³ Protecting and increasing individuals' and societies' human capital is the main objective in nearly every transition, not only in those between the education system and the labour market. Transitions from employment into retirement, for example, are only reasonable if the (tacit) knowledge of older people can at least be replaced by other workers' knowledge or transferred to younger workers. Similarly, policies should only encourage those transitions out of the labour market into homemaking and caretaking that do not waste any human capital.¹⁴ The same is true for transitions between different employment contracts or working-time arrangements. In addition, qualifications serve as a kind of insurance against the risk of

12 For a reflection on situational analysis and the rationality principle, see Notturmo (1998).

13 In its original version, (microeconomic) human capital theory is focussed on individual education choices, whereas the TLM concept mainly emphasises education from the viewpoint of 'public interest'. However, policies recommended by the TLM approach are targeted to reduce income and employment risks that occur when individuals make transitions out of employment into education and, therefore, motivate them to make these transitions.

14 Household and caretaking work is, of course, not a waste of human capital in itself, but interrupting one's career creates disadvantages and skills mismatches later on, because the paradigm of a continuous career is still standard in most countries.

social exclusion. Hence, a lot of research based on the TLM approach applies human capital theory (cf. Schömann and O'Connell 2002).¹⁵

Apart from human capital theory, which is of major importance in the analysis of labour markets in general, there are a number of other theories that laid the foundations for the TLM approach, including segmentation theory (Edwards et al. 1975), signalling theory (Spence 1973), or insider-outsider-theory (Lindbeck and Snower 1989). All of these theories have in common that they more or less describe labour market and policy failures, which the TLM approach aims to overcome by alleviating labour market transitions.

With its focus on labour market transitions – defined as periods or processes – the TLM concept closely resembles the life course approach (Anxo et al. 2007; Anxo et al. 2007). Life-course theory stands out from among the other theories mentioned above because both approaches complement each other in the sense that the time dimension of the life-course approach provides the sociological basis by examining sequential long-lasting processes containing a couple of single transitions. Additionally, life-course research always looks for the institutional context as one of the major determinants of individual life courses. To this institutional focus, the TLM concept adds the regulatory or policy component by assuming life-courses to be systematically arranged by the individuals themselves and by the policy measures provided. As Schmid states: “[...] the life course is and should be socially constructed and not left to be shaped by economic forces alone” (Schmid 2007: 8).

The life-course concept has a larger scope than the TLM concept, making transitions constituent parts of the life course (Heinz and Marshall 2003). Within life course research, the process of de-standardization remains one of the most important issues (cf. Heinz and Krüger 2001). This process is seen as potentially uncontrolled and a result of individualisation, loosening the power of social ties and norms and globalisation, which both results in increasing demand for flexibility.¹⁶ Empirically, this can be shown by increasingly turbulent vocational careers or family histories showing non-standard transitions and statuses, for example (Berger et al. 1993; Elzinga and Liefbroer 2007; Martin et al. 2008). At the same time, these processes constitute one of the central assumptions of the TLM concept, namely the existence of an increasing number of labour market transitions. Whereas the sociological life-course approach, theoretically, is only focused on the interrelation between the individual and society or between the individual and institutions, the TLM approach additionally emphasizes the political dimension. The increasing probability of transitions creates a couple of risks – e.g. income or employment risks (Schmid 2008: 283f.) – and these need to be minimised. Moreover, the remaining risks should be distributed equally among the actors involved – e.g. employers, em-

15 To a certain extent, the frequent application of human capital theory reflects a kind of ‘academic fashion’ because there are a couple of other theories that could be applied to the analysis of education transitions.

16 It should be mentioned that the process of de-standardisation varies across life domains (work, family, etc.), across countries, across social groups, and across gender (Brückner and Mayer 2005; Elzinga and Liefbroer 2007; Widmer and Ritschard 2009).

ployees, or the government – by developing TLMs. Hence, the sociological life-course approach provides the social basis for the political-science centred TLM concept. Or, in other words, the TLM concept can be seen as the political science complement to the life-course approach.

Furthermore, the life-course approach helps solve another very important problem of the TLM approach by providing the necessary connection between transitions of different kinds. By looking at the entire life course, interrelations and trade-offs between different policy subfields can be identified, e.g. the effects of early retirement on enterprises' further training activities. Embracing this life-course perspective is a major opportunity for future TLM research because their obvious similarities notwithstanding, the TLM concept too often analyses different transitions separately and not in relation to each other.¹⁷ For example, even though the transition into retirement has been analysed extensively (Courtioux 2005; Courtioux et al. 2005; Putman 2005), and even in comparative research designs, it has hardly been studied in relation to the initial vocational education system and the further training system, both of which constitute certain constraints for retirement policies. Exceptions are the transitions between education and employment in terms of life-long learning (Schömann and O'Connell 2002; Lassnigg et al. 2007) and the transition between different working-time arrangements in terms of work-life balance (Anxo et al. 2007). The focus on life-long learning, which is supported politically by the European Commission, also has led TLM research to consider education-employment transitions early as well as later in the life course. The same is true for questions regarding work-life balance.

However, the analysis of interaction effects or – in other words – complex causalities between transitions and transition policies of different kinds remain an underdeveloped field for future TLM research. They are necessary to understand how employment and welfare regimes function, and downright indispensable if the TLM concept aims to make policy recommendations by indentifying best practises to be emulated in other countries. For conducting this kind of analyses, certain methodological innovations are necessary.

17 This is partly reflected by the organisational structure of the TLM.NET project, where work packages were separated by transition.

6. New Methodological Tools

The range of tools used by TLM researchers seems to be quite diverse, including quantitative and qualitative methods applied to both case-studies and comparative designs. Integrated or mixed-method designs, however, have rarely been applied. In other words, researchers conducting micro-level transition analyses are methodologically separated from those analysing institutional or policy effects. While the concentration on the 'risk' dimension of transitions at the micro-level points to probability regression models (e.g. logit or probit models and event history analysis models), the analysis of policies remains limited to the qualitative level of (single) case studies. Both of them are useful in their own right, but the added value of the TLM approach (connecting micro and macro levels) does not seem to be reflected methodologically and, therefore, remains underdeveloped. The case of the probability regression model, which is used extensively in microeconomics, illustrates this problem quite well: Whereas the methodology is highly developed, the level of cognition remains at the individual level, and conclusions regarding the institutional or macro level pretty much remain well-informed considerations. The same is true of event history models.¹⁸

The analysis of institutional regimes is also at the centre of the TLM concept, because the creation and the effectiveness of TLM policies depend on the respective institutional framework. This is why a couple of papers and articles deal with either single-case analyses (e.g. Larsen 2005; van Velzen 2005) or with existing welfare or employment regime typologies (e.g. Muffels 2005), which aim to represent an aggregate and complex set of institutional regulations. Despite its importance within the TLM concept, the analysis of institutional configurations has a great deal of potential for further development with regard to the above-mentioned 'functional equivalents', which emerge from the holistic view on institutions, actors, and labour market processes. Functional equivalents describe the fact that different combinations of different independent variables can have the same effects. This is what Mill (1843) called a "plurality of causes"¹⁹, and it poses a challenge for classical regression analysis, which is mainly based on additive causation. Thus, the analysis of aggregated institutional effects –reflected by the regime approach – could benefit from being refined by examining configurations of institutional components in more detail. From a methodological viewpoint, the application of Qualitative Comparative Analysis (Rihoux and Ragin 2009) seems to be promising and could serve as an exploratory supplement for innovative, quantitative methods. Because the TLM approach focuses on different levels (individuals, institutions), applying appropriate methods, mainly of multilevel regression, is essential.

18 Furthermore, event history models suffer from the limitation regarding the number of events under consideration. If only a single event (transition) is taken into account, they do not reflect enough of the transition's complexity. If more events are included in these models, they become imprecise (Halpin 2003: 7).

19 Further synonyms are "equifinality" or "multiple causation" (cf. King et al. 1994).

In fact, the innovative potential for TLM analyses could only be used if case studies, regime typologies and individual transition analyses, as a first step, were conducted within a common methodological and theoretical framework in order to explore the interrelations between different institutions and policies and their respective outcomes within a certain institutional configuration, i.e. a certain country. This must be accompanied by further steps if we seriously want to establish an integrated approach, a goal inherent to the TLM concept. In order to be applicable to additional cases, the information gained from micro-level transition analyses, single-case studies, and regime typologies must be combined into a comparable analytical framework enabling us to test our hypotheses. Otherwise, the TLM approach's individual dimensions will continue to drift apart.

This procedure calls for appropriate data, which are not available at this time. These data have to meet the following requirements: They must cover a number of Western industrialised countries (ideally including threshold countries), be longitudinal in nature in order to reproduce transitions processes, and should comprise individual information on transitions as well as aggregate information on social and employment institutions and policies. Hence, future research projects based on the TLM approach can only contribute to the further development of the concept if they also involve the collection of appropriate data, either from existing resources or self-conducted surveys.

7. Summary

This paper's objective was to provide a theoretical and methodological stock-taking of the concept of transitional labour markets, accompanied by an illustration of its future potential. At the same time, it meant to show how it stands out from conventional transition or labour market research. The added value of the TLM concept is the comprehensive view it takes of the labour market, involving not only the individual, but also the institutional and policy levels. Additionally, the concept comprises normative aspects of how labour markets should work and empirical analyses of their as-is state in order to develop policy recommendations. Academically, the TLM concept has a comparative focus, while being open to a range of theoretical and methodological influences. This openness constitutes an ongoing challenge in terms of keeping the concept's elasticity at an appropriate level, which requires establishing some synchronicity between theoretical and methodological development. With regard to the main project publications, the major observation was that theoretical or conceptual development has increased at the expense of methodological developments. In order to keep up with the theoretical strength of the TLM concept, a number of potential fields for promising methodological activities were identified.

Transition, the basic unit of analysis, needs to be defined precisely. It needs to be distinguished from status change on the one hand and from the life course (trajectory) concept on the other. This must be accompanied by the development of an appropriate methodological toolbox, which should consist of exploratory and inferential methods. In the same context, generalising and expanding the transition typology to include integrative, maintenance, and exclusionary transitions holds promising potential for future work. Strengthening the comparative character of evaluation methodology remains another field of activity for future developments of the TLM concept. This includes the establishment of a systematic analytical framework for ALMP evaluation, an effort already begun by Schmid et al. (1997). Furthermore, bridging the micro-macro gap remains a problem that has not been solved satisfactorily. Although multilevel analysis becomes more and more fashionable, there is still potential regarding the application of these methods to transition analysis. Additionally, there is a need to identify functional equivalents on both the institutional and the policy level, for which exploratory methods such as QCA could be applied. Finally, there is room for extending the geographical focus of the TLM concept. Other countries are worth to be considered with the help of the TLM concept, not only because the European Union now comprises the countries of Eastern Europe, but also because the world's emerging markets are catching up.

References

- Anxo, D., C. Erhel, et al., Eds. (2007). *Labour Market Transitions and Time Adjustment Over the Life Course*. Amsterdam, Dutch University Press.
- Anxo, D., C. Fagan, et al. (2007). "Patterns of Labour Market Integration in Europe. A Life Course Perspective on Time Policies." *Socio-Economic Review* 5(2): 233-260.
- Becker, G. S. (1962). "Investment in Human Capital: A Theoretical Analysis." *Journal of Political Economy* 70(5, Part 2): 9-49.
- Becker, G. S. (1975). *Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education*. New York, Columbia University Press.
- Berger, P. A., P. Steinmüller, et al. (1993). "Differentiation of Life-Courses? Changing Patterns of Labour Market Sequences in West Germany." *European Sociological Review* 9(1): 43-65.
- Bothfeld, S. and J. O'Reilly (2000). *Movin Up or Moving Out? Transitions through Part-Time Employment in Britain and Germany. Working-Time Changes. Social Integration through Transitional Labour Markets*. J. O'Reilly, I. Cebrián and M. Lallement. Cheltenham/Northampton, Edward Elgar: 132-172.
- Brzinsky-Fay, C. (2007). "Lost in Transition? Labour Market Entry Sequences of School Leavers in Europe." *European Sociological Review* 23(4): 409-422.
- Brzinsky-Fay, C. (2008). *Get the Balance Right: The Sequence Approach as a Tool for Flexicurity Policies in the School-to-Work Transition. Innovating European Labour Markets. Dynamics and Perspectives*. P. Ester, R. Muffels, J. Schippers and T. Wilthagen. Cheltenham/Northampton, Edward Elgar: 275-296.
- Card, D., J. Kluve, et al. (2009). *Active Labor Market Policy Evaluations: A Meta-Analysis*. Bonn, IZA.
- Cebrián, I., M. A. Davia, et al. (2003). *Flexibility in the Spanish Labour Market: Working Time and Temporary Employment. Regulating Working-Time Transitions in Europe*. J. O'Reilly. Cheltenham/Northampton, Edward Elgar: 201-239.
- Courtioux, P. (2005). *Part-time Early Retirement in France: Why Did It Fail?* Amsterdam, SISWO.
- Courtioux, P., L. Davoine, et al. (2005). *Pension Reforms and the Labour Market. An Impossible Mission?* Amsterdam, SISWO.
- de Gier, E. and A. van den Berg, Eds. (2005). *Managing Social Risks through Transitional Labour Markets. Towards an Enriched European Employment Strategy*. Apeldoorn/Antwerpen, Het Spinhuis.
- de Koning, J. (2007). *Is the Changing Pattern in the Use of Active Labour Market Policies Consistent with what Evaluations Tell us about their Relative Performance? The Evaluation of Active Labour Market Policies. Measures, Public Private Partnerships and Benchmarking*. J. de Koning. Cheltenham/Northampton, Edward Elgar: 23-45.

- de Koning, J. and H. Mosley, Eds. (2001). *Labour Market Policy and Unemployment. Impact and Process Evaluations in Selected European Countries*. Cheltenham/Northampton, Edward Elgar.
- de Koning, J. and Y. Peers (2007). *Evaluating Active Labour Market Policies Evaluations*. Berlin, WZB.
- Edwards, R. C., M. Reich, et al., Eds. (1975). *Labor Market Segmentation*. Lexington/Toronto/London, D.C. Heath and Company.
- Elzinga, C. H. and A. C. Liefbroer (2007). "De-standardization of Family-Life Trajectories of Young Adults: A Cross-National Comparison Using Sequence Analysis." *European Journal of Population* 23(3-4): 225-250.
- Gazier, B. (2002). *Transitional Labour Markets: From Positive Analysis to Policy Proposals. The Dynamics of Full Employment. Social Integration Through Transitional Labour Markets*. G. Schmid and B. Gazier. Cheltenham/Northampton, Edward Elgar: 196-232.
- Halpin, B. (2003). *Tracks Through Time and Continuous Processes: Transitions, Sequences and Social Structure*. *Frontiers in Social and Economic Mobility*, Cornell University.
- Heinz, W. R. and H. Krüger (2001). "Life Course: Innovations and Challenges for Social Research." *Current Sociology* 49(2): 29-45.
- Heinz, W. R. and V. W. Marshall, Eds. (2003). *Social Dynamics of the Life Course. Transitions, Institutions and Interrelations. The Life Course and Aging*. New York, Aldine de Gruyter.
- Hernanz, V., F. Origo, et al. (2005). *Dreaming of a Stable Job: The Transition of Temporary Workers in Italy and Spain*. Amsterdam, SISWO.
- King, G., R. O. Keohane, et al., Eds. (1994). *Designing Social Inquiry. Scientific Inference in Qualitative Research*. Princeton, Princeton University Press.
- Kruppe, T. (2002). *The Dynamics of Employment in the European Union: An Exploratory Analysis. The Dynamics of Full Employment. Social Integration Through Transitional Labour Markets*. G. Schmid and B. Gazier. Cheltenham/Northampton, Edward Elgar: 277-297.
- Larsen, F. (2005). *Active Labour Market Policy in Denmark as an Example of Transitional Labour Market and Flexicurity Arrangements*. Amsterdam, SISWO.
- Lassnigg, L., H. Burzlaff, et al., Eds. (2007). *Lifelong Learning. Building Bridges through Transitional Labour Markets*. Apeldoorn/Antwerpen, Het Spinhuis.
- Lindbeck, A. and D. J. Snower (1989). *The Insider-Outsider Theory of Employment and Unemployment*. Cambridge, MIT Press.
- Martin, P., I. Schoon, et al. (2008). "Beyond Transitions: Applying Optimal Matching Analysis to Life Course Research." *International Journal of Social Research Methodology* 11(3): 179-199.
- Mill, J. S. (1843). *A System of Logic, Kitiocinative and Inductive, Being a Connected View of the Principles of Evidence, and the Methods of Scientific Investigation*. London, Parker, Son, and Bourn.
- Muffels, R. (2005). *Labour Market Mobility and Employment Patters. Researching Labour Market Transitions in European Welfare Regimes*. Amsterdam, SISWO.

- Muffels, R., Ed. (2008). *Flexibility and Employment Security in Europe. Labour Markets in Transition*. Cheltenham/Northampton, Edward Elgar.
- Muffels, R., T. Wilthagen, et al. (2002). *Labour Market Transitions and Employment Regimes: Evidence on the Flexibility-Security Nexus in Transitional Labour Markets*. Berlin, Wissenschaftszentrum Berlin (WZB).
- Neugart, M. and K. Schömann, Eds. (2002). *Forecasting Labour Markets in OECD Countries. Measuring and Tackling Mismatches*. Cheltenham/Northampton, Edward Elgar.
- Notturmo, M. A. (1998). "Truth, Rationality, and the Situation." *Philosophy of the Social Sciences* 28(3): 400-421.
- O'Connell, P. and F. McGinnity (2002). *Active Labour Market Policies, Market Orientation and Gender: Findings for Young People in Ireland. Education, Training and Employment Dynamics*. K. Schömann and P. O'Connell. Cheltenham/Northampton, Edward Elgar: 101-118.
- O'Reilly, J., Ed. (2003). *Regulating Working-Time Transitions in Europe*. Cheltenham/Northampton, Edward Elgar.
- O'Reilly, J., I. Cebrián, et al., Eds. (2000). *Working-Time Changes. Social Integration Through Transitional Labour Markets. Labour Markets and Employment Policy*. Cheltenham/Northampton, Edward Elgar.
- Popper, K. (1972). *Objective Knowledge. An Evolutionary Approach*. Oxford, Oxford University Press.
- Popper, K. (1994 [1963]). *Models, Instruments, and Truth. The Myth of the Framework. In Defence of Science and Rationality*. M. A. Notturmo. London/New York, Routledge: 154-184.
- Putman, L. (2005). *Dutch Older Workers and Their Labour Market Participation. Changing the Social Norm of Early Retirement*. Amsterdam, TLM.NET.
- Reci, I. and J. de Bruijn (2006). *Transitional Labour Markets. Past, Present and Future Applications*. Amsterdam, SISWO.
- Rihoux, B. and C. C. Ragin, Eds. (2009). *Configurational Comparative Methods. Qualitative Comparative Analysis (QCA) and Related Techniques. Applied Social Research Methods Series*. Los Angeles/London/New Dehli/Singapore, Sage.
- Sackmann, R. and M. Wogens (2003). *From Transitions to Trajectories. Sequence Types. Social Dynamics of the Life Course. Transitions, Institutions, and Interrelations*. W. R. Heinz and V. W. Marshall. New York, Aldine de Gruyter: 93-115.
- Schmid, G. (1998). *Transitional Labour Markets: A New European Employment Strategy*. Berlin, Wissenschaftszentrum Berlin für Sozialforschung (WZB).
- Schmid, G. (2002). *Towards a Theory of Transitional Labour Markets. The Dynamics of Full Employment. Social Integration Through Transitional Labour Markets*. G. Schmid and B. Gazier. Cheltenham/Northampton, Edward Elgar: 151-195.
- Schmid, G. (2006). "Social Risk Management Through Transitional Labour Markets." *Socio-Economic Review* 4(1): 1-33.
- Schmid, G. (2007). *Preface. Labour Market Transitions and Time Adjustment of the Life Course*. D. Anxo, C. Erhel and J. Schippers. Amsterdam, Dutch University Press: 7-8.

- Schmid, G. (2008). Full Employment in Europe. Managing Labour Market Transitions and Risks. Cheltenham/Northampton, Edward Elgar.
- Schmid, G. and B. Gazier, Eds. (2002). The Dynamics of Full Employment. Social Integration through Transitional Labour Markets. Cheltenham/Northampton, Edward Elgar.
- Schmid, G., J. O'Reilly, et al., Eds. (1996). International Handbook of Labour Market Policy and Evaluation. Cheltenham/Brookfield, Edward Elgar.
- Schmid, G., J. O'Reilly, et al. (1996). Theory and Methodology of Labour Market Policy and Evaluation: An Introduction. International Handbook of Labour Market Policy and Evaluation. G. Schmid, J. O'Reilly and K. Schömann. Cheltenham/Brookfield, Edward Elgar: 1-33.
- Schmid, G. and K. Schömann (2004). Managing Social Risks Through Transitional Labour Markets. Towards A European Social Model. Amsterdam, SISWO.
- Schmid, G., K. Schömann, et al. (1997). Evaluierung der Arbeitsmarktpolitik. Ein analytischer Bezugsrahmen am Beispiel des Arbeitsmarktpolitischen Rahmenprogramms in Berlin. Berlin, Wissenschaftszentrum Berlin für Sozialforschung (WZB).
- Schömann, K. and R. Becker (2002). A Long-Term Perspective on the Effects of Training in Germany. Education, Training and Employment Dynamics. K. Schömann and P. O'Connell. Cheltenham/Northampton, Edward Elgar: 153-185.
- Schömann, K. and P. O'Connell, Eds. (2002). Education, Training and Employment Dynamics. Transitional Labour Markets in the European Union. Cheltenham/Northampton, Edward Elgar.
- Spence, M. (1973). "Job Market Signalling." The Quarterly Journal of Economics 87(3): 355-374.
- van Velzen, M. (2005). Moving On and Up? Facilitating Transitions for Flexible Workers in Value Added Logistics. Amsterdam, SISWO.

Books published by members of the research unit “Skill Formation and Labor Markets”

(only available from commercial retailers)

2009

Hildebrandt, Eckart; Philip Wotschack; Almut Kirschbaum (unter Mitarbeit von Svenja Pfahl und Franziska Scheier) (2009): Zeit auf der hohen Kante. Langzeitkon-
ten in der betrieblichen Praxis und Lebensgestaltung von Beschäftigten. Forschung
aus der Hans-Böckler-Stiftung, Bd. 98. Berlin: edition sigma

Solga, Heike; Justin Powell; Peter A. Berger (Hg.) (2009): Soziale Ungleichheit. Klassi-
sche Texte zur Sozialstrukturanalyse. Frankfurt am Main: Campus Verlag

2008

Mayer, Karl Ulrich; Heike Solga (Eds.) (2008): Skill Formation – Interdisciplinary and
Cross-National Perspectives. New York: Cambridge University Press

Söhn, Janina (2008): Die Entscheidung zur Einbürgerung. Die Bedeutung von Staats-
bürgerschaft für AusländerInnen in der Bundesrepublik Deutschland – Analysen zu
den 1990er-Jahren. Saarbrücken: VDM Verlag Dr. Müller

2007

Baethge, Martin; Heike Solga; Markus Wieck (2007): Berufsbildung im Umbruch –
Signale eines überfälligen Aufbruchs. Berlin: Friedrich-Ebert-Stiftung. (auch online
verfügbar: <http://library.fes.de/pdf-files/stabsabteilung/04258/studie.pdf>)

Martens Kerstin, Alessandra Rusconi and Kathrin Leuze (eds.) (2007): New Arenas of
Educational Governance – The Impact of International Organizations and Markets on
Educational Policymaking. Houndmills, Basingstoke: Palgrave

2006

Rusconi, Alessandra (2006): Leaving the Parental Home in Italy and West Germany:
Opportunities and Constraints. Aachen: Shaker Verlag

2005

Solga, Heike (2005): Ohne Abschluss in die Bildungsgesellschaft. Die Erwerbschancen
gering qualifizierter Personen aus ökonomischer und soziologischer Perspektive.
Opladen: Verlag Barbara Budrich

Discussion Papers

Research Unit “Skill Formation and Labor Markets”

(available on <http://www.wzb.eu/publikation/>
hard copies via Informations- und Kommunikationsreferat, Wissenschaftszentrum
Berlin für Sozialforschung, Reichpietschufer 50, 10785 Berlin)

2010

SP I 2010-501

Phyllis Moen, From ‘Work-Family’ to the ‘Gendered Life Course’ and ‘Fit.’ Five Challenges to the Field, 19 p.

SP I 2010-502

Philip Wotschack, Working-Time Options over the Life Course – New Challenges to German Companies in Times of Crisis, 18 p.

SP I 2010-503

Heike Solga, Claudia Kretschmann, *Follow-up-Studie zur Evaluation des Projekts „Abschlussquote erhöhen – Berufsfähigkeit steigern“*, 24 p.

SP I 2010-504

Lisa Pfahl, Justin J.W. Powell, The Special Education Profession and the Discourse of Learning Disability in Germany, 16 p.

SP I 2010-505

Philip Wotschack, Lebensarbeitszeitkonten in der Perspektive sozialer Ungleichheit. Kumulation oder Abbau sozialer Benachteiligungen im Lebensverlauf?, 44 p.

SP I 2010-506

Franziska Scheier, Eckart Hildebrandt, Arbeitszeit – eine wichtige Zeitdimension für die Lebenslaufperspektive?, 61 p.

SP I 2010-507

Christian Brzinsky-Fay, The Concept of Transitional Labour Markets. A Theoretical and Methodological Inventory, 21 p.

2009

SP I 2009-501

Kathrin Leuze, Alessandra Rusconi, Should I Stay or Should I Go? Gender Differences in Professional Employment, 26 p.

SP I 2009-502

Heike Solga, Lisa Pfahl, *Doing Gender* im technisch-naturwissenschaftlichen Bereich, 57 p.

SP I 2009-503

Johannes Uhlig, Heike Solga, Jürgen Schupp, Ungleiche Bildungschancen: Welche Rolle spielen *Underachievement* und Persönlichkeitsstruktur dabei?, 33 p.

SP I 2009-504

Martina Dieckhoff, Nadia Steiber, In Search of Gender Differences in Access to Continuing Training: Is there a Gender Training Gap and if yes, why?, 25 p.

SP I 2009-505

Günther Schmid, Paula Protsch, Wandel der Erwerbsformen in Deutschland und Europa, 46 p.

SP I 2009-506

Justin J.W. Powell, Laurence Coutrot, Lukas Graf, Nadine Bernhard, Annick Kieffer, Heike Solga, Comparing the Relationship between Vocational and Higher Education in Germany and France, 57 p.

SP I 2009-507

Heike Solga, Der Blick nach vorn: Herausforderungen an das deutsche Ausbildungssystem. Thesenpapier zum Symposium des WZB am 19.11.2009, 26 p.

2008

SP I 2008-501

Justin J.W. Powell, Heike Solga, Internationalization of Vocational and Higher Education Systems – A Comparative-Institutional Approach, 49 p.

SP I 2008-502

Anja P. Jakobi, Alessandra Rusconi, Opening of Higher Education? A Lifelong Learning Perspective on the Bologna Process, 32 p.

SP I 2008-503

Janina Söhn, Bildungschancen junger Aussiedler(innen) und anderer Migrant(inn)en der ersten Generation. Ergebnisse des DJI-Jugendsurveys zu den Einwandererkohorten seit Ende der 1980er-Jahre, 37 p.

SP I 2008-504

Lisa Pfahl, Legitimationen schulischer Aussonderung. Eine Rekonstruktion des Lernbehinderungsdiskurses im 20. Jahrhundert in Deutschland, 42 p.

SP I 2008-505

Alessandra Rusconi, Heike Solga, A Systematic Reflection upon Dual Career Couples, 32 p.

SP I 2008-506

Paula Protsch, Wachsende Unsicherheiten: Arbeitslosigkeit und Einkommensverluste bei Wiederbeschäftigung, 27 p.

SP I 2008-507

Lukas Graf, Applying the Varieties of Capitalism Approach to Higher Education: A Case Study of the Internationalisation Strategies of German and British Universities, 65 p.